AUGUST

August 1: LAUNCH DAY: STS 43

Liftoff for STS 43 is scheduled for 11:01 a.m. today; the five-member crew left their quarters in the Operations & Checkout Building at Kennedy Space Center and headed for Atlantis aboard Launch Complex 39A. Mission managers are watching rain showers which are expected to move into the launch area during the day. The launch window extends until 3:06 p.m. NASA's failed effort to launch Atlantis on July 24 was due to a faulty main engine controller. The controller failed due to a defected soldered joint on a circuit board within the engine computer, according to **Jerry Smelser**, Main Engine Project Office at Marshall Space Flight Center (Huntsville, AL). Smelser said, "This particular joint had a deficiency in the manufacturing process. However, it was sufficiently attached that it did perform its function for a period of time. This clearly is an isolated case." Technicians for Honeywell Inc. (controller manufacturer) found the improperly soldered joint in a search of about 9,000 such joints in the computer; it had been undetected in five previous Shuttle missions. [Brown, FLORIDA TODAY, p. 5A, Aug. 1, 1991, Leary, THE NEW YORK TIMES, p. A12, Aug. 1, 1991.]

[] WEATHER, HARDWARE CAUSE SCRUB: STS 43

Atlantis' STS 43 mission was scrubbed because of a problem with a switch which raised doubts about whether the crew cabin was properly pressurized; when that problem was solved, bad weather moved into the launch area and forced the postponement of the liftoff until August 2. The launch was scrubbed at 12:28 p.m. by Shuttle Launch Director **Robert B. Sieck**. Crosswinds at the Shuttle Landing Facility rose above the 17 mph mark; that is a violation of launch rules. "We were looking very good at the beginning of the window, but after the first half hour, it deteriorated rapidly," said Staff Sgt. **Salinda Larabee**, an Air Force meteorologist. "The problem was the threat of rain showers and, to some extent, high winds." [Halvorson and Brown, FLORIDA TODAY, p. 1A, Aug. 2, 1991, Date, THE ORLANDO SENTINEL, p. A-3, Aug. 2, 1991, Leary, THE NEW YORK TIMES, p. A 11, Aug. 2, 1991.]

[] SPACEPORT USA RESTAURANT IMPROVED

Dining facilities are being improved through a $1.3 million expansion of the Lunch Pad restaurant at Spaceport USA. The eatery will more than triple its floor space, from 2500 square feet to 7800. The 11,500 square feet of adjacent outdoor patio area will be placed under a protective cover. The exterior of the restaurant will be remodeled to match that of the recently upgraded Spaceport Central building. By the end of the year, the Spaceport's souvenir store - The Gift Gantry - will undergo a major interior renovation; the Flight Crew Training Building, the first tour stop, will be modified to ease access and egress of visitors. The expansion projects are financed through a Services Improvement Account generated by sales to visitors; there are no taxpayer funds involved. In July, there were 298,662 visitors at Spaceport USA. Year-to-date attendance stands at 1,621, 235.

[SPACEPORT USA RELEASE NO. NT0589, Aug. 1, 1991, "Spaceport Expands Restaurant," FLORIDA TODAY, p. 12C, Aug. 3, 1991.]

August 2: **STS 43 LAUNCHES SUCCESSFULLY**

"We had a great countdown. We had no problems to deal with. We did what we like to do best, launch on time with no anomalies. It's good to be flying again," said Shuttle Launch Director **Robert B. Sieck**, at a news conference after Atlantis lifted off at 11:02 this morning. Mission Commander **John Blaha** said, "It was the best ride in the world." Six hours after launch the crew of five launched its primary cargo, the Tracking and Data Relay Satellite. The STS 43 mission was the ninth for Atlantis; it had been delayed twice for technical problems and once for bad weather. There had been a further technical problem before launch; engineers decided that the problem with a signal relayer was not critical to the mission since the relayer would not be used in the mission. Early in the flight there was a malfunction in a system which was used to cool lubricants for the auxiliary power units; engineers decided that this too was not serious enough to affect the mission. [Leary, THE NEW YORK TIMES, p. 6, Aug. 3, 1991, Brown and Halvorson, FLORIDA TODAY, pp. 1A-2A, Aug. 3, 1991, Date, THE ORLANDO SENTINEL, pp. A-1 & A-10, Aug. 3, 1991.]

[] **BUCKINGHAM: FIRST LAUNCH COMMENTARY**

Kennedy Space Center spokesman **Bruce Buckingham** had a career first today when he became the seventh person to handle the job of "Voice of Shuttle Launch Control," since the beginning of Space Shuttle launches on April 12, 1981. [The other commentators have been **Hugh Harris, Lisa Malone, Jim Ball, Mark Hess, George Diller** and Jack King.] Buckingham was greeted with cheers when, a half hour after launch, he returned to the KSC Press Site. He said, "It was one of the most intense periods of my life." Buckingham's father, **Jamie Buckingham**, is pastor of the Tabernacle Church (Melbourne, FL) said of his son, "When you grow up in the home of a writer and a speaker, part of it just rubs off, I think. We're real proud. This is the kind of thing every dad hopes for his son some day." Buckingham, 35, joined NASA in September 1985, after working for former U. S. Rep. **Bill Nelson**. [Banke, FLORIDA TODAY, p. 6A, Aug. 3, 1991.]

August 5: **STS-43: POST-LAUNCH**

Launch Complex 39A sustained minimal damage from Atlantis' STS 43 launch August 2 at 11:02:00.0432 a.m. EDT. The solid rocket boosters arrived at Hangar AF at 12:30 p.m. EDT on August 3. No unusual anomalies have been reported; the exit cone has been removed from the right booster. High pressure water will be used to strip the boosters of their thermal protective foam. STS 43 is expected to conclude with a landing at Kennedy Space Center's Shuttle Landing Facility August 11, at 8:19 a.m. EDT on orbit 142. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 5, 1991.]

DELTA ROCKET GROUNDED

A technical problem with its navigation satellite cargo will keep an Air Force Delta rocket from launching for at least two weeks. The McDonnell Douglas Systems Co. rocket had been scheduled to liftoff August 8 from Launch Complex 17 at Cape Canaveral Air Force Station. The earliest opportunity for launch will come August 22. The cargo is a Navstar Global Positioning System satellite and would be the 12th in the system. [Banke, FLORIDA TODAY, p. 1A, Aug. 6, 1991.]

ASTRONAUTS MEMORIAL SHUTS DOWN: SAFETY

Safety concerns at Spaceport USA caused the Astronauts Memorial to be closed to the public today, officials at the attraction said. **Randy Barridge**, of the Astronauts Memorial Foundation, said, "The memorial itself, as far as its ability to rotate and pitch, has been shut down for safety reasons." Engineers from VSL Corp. which designed the memorial are flying to Florida to inspect the memorial which worked improperly today. Barridge said the moving memorial was making an unexplained popping sound. He said, "NASA engineers and our own consultants have determined that the mechanism that controls the pitch of the mirror got out of synch by an inch and a half." Barridge said that engineer had not yet found any structural damage. He said the popping sound that had been heard might have come from several screws that were found broken loose. No estimates of the repair's cost or the time needed to effect the repair were available. Barridge said that determining such details was low on the Astronaut Memorial Foundation's priority list. "We just want to get it back in operation," he said. Scaffolding will be erected August 8 to allow repairmen to make inspections of the $6.2 million "Space Mirror." [Banke, FLORIDA TODAY, p. 1A, Aug. 6, 1991, "Memorial Closed," USA TODAY, p. 3A, Aug. 7, 1991, "Memorial Closed," FLORIDA TODAY, p. 1B, Aug. 8, 1991, "Engineers Inspect Astronauts Memorial," FLORIDA TODAY, p. 1B, Aug. 9, 1991, Date, THE ORLANDO SENTINEL, pp. A-1 & A-7, Aug. 6, 1991.]

PROCESSING: DISCOVERY & COLUMBIA

In the Vehicle Assembly Building at Kennedy Space Center, workers attached the Space Shuttle Discovery to its external tank and solid rocket boosters today and will check electrical connections tomorrow, according to **Lisa Malone**, KSC spokeswoman. Discovery will continue pre-rollout processing in the VAB for another week and should be rolled to Launch Complex 39A beginning 12:01 a.m. August 12. Discovery's STS 48 mission will deploy NASA's Upper Atmosphere Research Satellite (UARS). In the Orbiter Processing Facility, the Space Shuttle Columbia is undergoing the final preparations for its ferry flight to Palmdale, CA, where it will spend half a year receiving modifications and an overhaul. Before its flight, Columbia will spend one day at KSC in a newly refurbished processing hangar, according to Malone, so that workers can see how a Shuttle fits in the new work area. At a KSC hangar at Cape Canaveral Air Force Station, workers have begun disassembling Atlantis' two solid rocket boosters which were recovered over the weekend and towed through Port Canaveral to CCAFS.

[Banke, FLORIDA TODAY, p. 2A, Aug. 6, 1991.]

August 6: **STS-43: FLIGHT DAY 5**

The STS-43 solid rocket boosters are being stripped of thermal protective foam with a hydrolasing technique using high pressure water. The motor segments will be disassembled and shipped back to Thiokol in Utah for refurbishment. The aft and forward sections will be refurbished here at KSC by USBI. The mobile launcher platform used to launch STS-43 is being transferred today from Launch Complex 39A to the park site located just outside of the Vehicle Assembly Building. [KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 6, 1991.]

[] **STS 48 PREPARATIONS**

Electrical connections between Discovery and its external tank have been completed and the vehicle was powered up at 1:23 this morning. In progress is a Shuttle Interface Test which validates connections between the vehicle elements and the launch platform. Late on August 9, platforms will be retracted from the vehicle. Rollout to Launch Complex 39A is targeted for 12:01 a.m. August 12. [KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 6, 1991.]

August 7: **ATLANTIS BOOSTER REFURBISHMENT**

Technicians are continuing to strip thermal protective foam from the STS 43 solid rocket boosters with a hydrolasing technique using high pressure water. Both the robot hydrolaser and manual method are being used to strip the foam away. The aft skirts are scheduled to be removed from both boosters today. The motor segments will be disassembled and shipped back to Thiokol (Brigham City, UT) for refurbishment. The aft and forward skirts will be refurbished here at KSC by USBI. The mobile launcher platform used to launch STS 43 was transferred yesterday from Launch Complex 39A to the park site located just outside the Vehicle Assembly Building. KSC's Landing Team will assemble today for a briefing to review landing procedures and plans. That landing is expected to occur at Kennedy Space Center August 11 (Sunday) at 8:23 a.m. EDT, on orbit 142. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 7, 1991.]

[] **COLUMBIA'S FERRY FLIGHT**

Columbia's aft compartment has been closed out in preparation for its ferry flight to Palmdale, CA; the crew cabin has also been closed out and the tail cone has been installed for the journey. Work in progress includes closing out the flipper doors which protect the wing hinges and the transfer of the Orbiter itself to OPF Bay 3 for a fit check this morning at 10 a.m. Technicians are also awaiting the arrival today of the Shuttle Carrier Aircraft and the C141 Pathfinder aircraft. Tomorrow (August 8) at 4 a.m., Columbia and the SCA will be towed to the Mate Demate Device at the Shuttle Landing Facility (SLF) for mating. Departure for California is planned for 7 a.m. August 9. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 7, 1991.]

STS 48 LAUNCH PREPARATIONS

The Space Shuttle Discovery is presently undergoing a Shuttle Interface Test to validate connections between the Orbiter and the launch platform. Leak checks are being performed of the cavities between the external tank to Orbiter disconnects; tests of the solid rocket boosters ' hydraulic system are being conducted. The platforms around the vehicle must be retracted August 9; rollout to Launch Complex 39A is projected to take place August 12 beginning at 12:01 a.m. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 7, 1991.]

ENDEAVOUR'S FIRST POWER UP TESTS

Endeavour will be powered up this week at Kennedy Space Center; this significant event marks the beginning of major testing of the newest Space Shuttle prior to its April 1992 launch. "We're happy to get started on processing Endeavour for its first flight. We've worked hard to schedule all the required tests and the team is ready," said **Tip Talone**, Endeavour's Flow Director. Endeavour arrived at Kennedy Space Center's Shuttle Landing Facility atop the new 747 Shuttle Carrier Aircraft on May 7 of this year and it was temporarily housed in High Bay 2 of the Vehicle Assembly Building (VAB) until July 25 when it was transferred to the Orbiter Processing Facility Bay 1. In the VAB, several major components were installed in the newest Orbiter, including the liquid hydrogen 17-inch disconnect, the ammonia boiler, the flash evaporator and the external tank door drive mechanisms. The forward reaction control simulator was removed in the VAB, but work in the VAB centered on preparing the Orbiter for power up testing in the OPF.

Last week, the mock left and right orbital maneuvering system pods were removed from Endeavour and installed on Columbia for its ferry flight to California. "First Flow" tests of a vehicle, to be performed during Endeavour's planned seven-month stay in the OPF, are the most rigorous an Orbiter ever undergoes. Extensive integrated tests and checks of each system will validate the operation of the vehicle. Also in the OPF, several major vehicle components will be installed: the three new main engines featuring upgrades that include new controllers, the forward reaction control system, and two orbital maneuvering system (OMS) pods. For the first time, KSC's processing team will install the new drag-chute on an Orbiter. Endeavour is the first Orbiter outfitted with the drag chute pod. Stacking of the solid rocket boosters for Endeavour's flight is tentatively scheduled for the November/December period. Mating with the external tank is set to occur early next year. Once the Orbiter is completely outfitted and its systems fully tested, it will be towed to the VAB for mating with the ET and SRBs; this is scheduled to occur in mid-February 1992; rollout to the launch pad is planned for the following week. A Flight Readiness Firing, which is a standard requirement for all new vehicles, is targeted to occur in early March 1992. While bolted to the launch pad, the Orbiter's three main engines are fired for approximately 20 seconds. No astronauts will be aboard for this test. Objectives of the test include validating the integrity of the new Orbiter's systems and evaluation of the main propulsion system performance and propellant delivery

systems. Other routine tests and operations will also be performed while Endeavour is at the launch pad, including a Terminal Countdown Demonstration Test scheduled for March 1992. Endeavour's first mission, STS 49, will carry seven astronauts into space in April 1992. The mission will be highlighted by a space walk to attach an upper stage to reboost an Intelsat satellite which was stranded in an inoperable orbit following launch aboard a commercial Titan 3 rocket last March. [NASA/KSC RELEASE NO. 94-91, Aug. 7, 1991.]

August 8: **YOUNG: KSC LANDINGS ARE RISKY**

John Young, former STS 1 commander and presently a safety official at Johnson Space Center, said today that NASA is taking unnecessary risks with its expensive Space Shuttles by making Kennedy Space Center the prime landing site. Atlantis is due to land here on the morning of August 11. Young, who is a Special Assistant for Engineering, Operations and Safety at JSC, said, "It's an increased risk, and I told them that." He referred to the potential for saving up to $3 million per flight by landing at KSC and said that the cost of a lost $2 billion Orbiter vastly overshadows the savings. "If there's an accident, it's certainly going to look penny-wise and pound-foolish," said **John Pike**, Space Policy Analyst for the Federation of American Scientists. He advocated foregoing landings at KSC until all the Orbiters had been outfitted with drag chutes; only Endeavour has this safety feature. KSC has not been a primary landing site since April 19, 1985, when Discovery blew out a tire landing on the Shuttle Landing Facility runway at the space center. "We're making it very tough on ourselves. We'll land wherever it's safest," said **Jim Cast**, NASA spokesman. Space agency officials said that NASA had not taken the risks lightly but felt that modifications to the Orbiter brakes, tires and steering led them to believe that KSC landings can be made safely. ["Young: Landing Shuttle At KSC Increases Risk," FLORIDA TODAY, p. 1A, Aug. 9, 1991.]

[] **ENDEAVOUR POWERED UP**

The Space Shuttle Endeavour, newest member of the four-vehicle fleet, was powered up today in the Vehicle Assembly Building. "We're happy to get starting on processing Endeavour," said **John "Tip" Talone**, Processing Manager for the Orbiter. When Columbia has left for California, the new Orbiter will be moved to the OPF. During its seven-month stay in the Orbiter Processing Facility, Endeavour will undergo a series of initial tests and have its main engines installed along with other important flight gear. KSC technicians will also install a drag chute designed to help slow the Orbiter down on landing. [Brown, FLORIDA TODAY, p. 12A, Aug. 9, 1991.]

[] **COLUMBIA MODIFICATIONS**

Once Columbia arrives at Palmdale, CA, for a six-month stay for modifications, technicians will demate the Orbiter from the SCA using a device called the Orbiter Lifting Frame; then the vehicle will be transferred into Rockwell's Orbiter Assembly and Modification Facility. Some fifty (50) modifications are planned, including

improved nose wheel steering capability, carbon brakes, improved auxiliary power units and the five new general purpose computers. Additionally, Columbia will be outfitted with the drag chute pod and its thermal protection system will be enhanced. Changes to equip the Orbiter for an extended flight include increasing the capacity of vehicle systems such as power and waste collection, adding a regenerating system for removing carbon dioxide from the crew cabin atmosphere. installing two additional nitrogen tanks for the crew cabin atmosphere, and adding extra middeck lockers for stowage. With these changes, Columbia can support a mission up to 16 days in duration. As part of periodic maintenance, Columbia will undergo the most extensive structural inspections performed on an Orbiter to date. Visual and borescope inspections will be performed to identify any fatigue, stress or cracks in the Orbiter's structure. Columbia's last structural inspections, in 1984-85, were not as extensive. When it returns to KSC, Columbia will have a new identifying mark - its name painted on the right wing. The omission of its name painted on the outside of the ship has been a visible difference between Columbia and its sister ships. Its first mission on returning to KSC will be the STS 50 mission, targeted for June 1992; it will be of extended duration - 13 days - and carry a crew of seven and the United States Microgravity Lab-1 payload. Columbia is the oldest Shuttle; it has flown eleven times, including the first five missions of the program. It flew for the first manned Spacelab flight, the ASTRO-1 payload and retrieval of the Long Duration Exposure Facility. [NASA/KSC RELEASE NO. 96-91, Aug. 8, 1991, Date, THE ORLANDO SENTINEL, Aug. 9, 1991.]

ATLANTIS KSC LANDING: AUG. 11

The first planned end of mission at Kennedy Space Center since 1986 is set to occur at 8:24 EDT, August 11, on the Shuttle Landing Facility; it will be the eighth landing at KSC. This mission marks the first time since STS 61-C (January 1986) that NASA managers determined end-of-missions could again be scheduled at KSC. In January 1986, Columbia was unable to make a KSC landing as planned; after being waved off three days running due to bad weather, the Orbiter was instructed to land at Edwards Air Force Base (CA) and Edwards has been the primary site since that time. The Presidential Commission on the Challenger Accident indicated that modifications were needed on the Orbiters before KSC landing could resume.

Modifications made to the Space Shuttle fleet include upgrades to the main landing gear, an improved carbon braking system, and an upgrade to the nose wheel steering capability. These and other enhancements have been made and successfully tested both at Edwards and KSC. Enhancements have also been made and successfully tested both at Edwards and KSC. Enhancements have also been made at the SLF, including work to grind smooth half mile sections on each end of the runway to remove cross grooves. These were replaced with smaller "corduroy" ridges that run the length of the runway. The primary purpose of this change was to enhance safety by reducing tire wear. Two landings have been made since the return to flight in 1988; both of these had been scheduled

for landings at Edwards, but were diverted to KSC due to poor weather in California.

Previous landings at KSC were:

41-B - Challenger, Feb. 11, 1984

41-G - Challenger, Oct. 13, 1984

51-A - Discovery, Nov. 16, 1984

51-C - Discovery, Jan. 27, 1985

51-D - Discovery, April 19, 1985

STS-38 - Atlantis, Nov. 20, 1990

STS-39 - Discovery, May 6, 1991

General weather restrictions for a landing at KSC are specified in part as:

*Surface winds must be less than 20 knots in any direction, and less than 12 knots for crosswinds;

*The ceiling must be greater than 10,000 feet. For scattered clouds below 10,000 feet, cloud cover must be observed to be less than 20 percent at the deorbit burn go/no go decision time;

*Visibility must be seven miles or greater;

*There can be no precipitation at the surface or aloft in the proximity of the Orbiter;

*Thunderstorms, rain or the potential for lightning cannot be within 30 nautical miles of the landing site;

*Vertical cloud clearance at the 30 nautical mile range, must be greater than 2 nautical miles.

[NASA/KSC RELEASE NO. 95-91, Aug. 8, 1991, "Atlantis Set for Sunday Landing at KSC," FLORIDA TODAY, p. 1A, Aug. 10, 1991, Brown, FLORIDA TODAY, p. 1A, Aug. 11, 1991, Date, THE ORLANDO SENTINEL, p. A-15, Aug. 10, 1991, Date, THE ORLANDO SENTINEL, Aug. 11, 1991.]

August 9: **COLUMBIA: CALIFORNIA HERE IT COMES**

The Space Shuttle Columbia, the oldest of the four-vehicle Orbiter fleet, was scheduled to take off from the Shuttle Landing Facility for Palmdale, California this

morning at 10:30, but that was delayed a day due to deteriorating weather conditions. It has been stripped of its main engines, its nose-and-tail steering jets, fuel storage tanks and a number of other systems. The Orbiter will make the trip aboard the 747 Shuttle Carrier Aircraft. The first leg of the ferry flight is likely to be to Eglin Air Force Base (FL), with a possibility of continuing on to Tinker Air Field (Tulsa, OK); a decision will be made in flight. The final leg - to Palmdale, CA - will be made the following day. Takeoff tomorrow is scheduled for 7:00 a.m. In California, Columbia will its most extensive inspection ever on a veteran Space Shuttle. NASA spokesman **Ed Campion** said, "You could characterize it as your car going in for a major inspection." **Bascom Murrah**, NASA Manager for Columbia Processing said, "This is kind of an interim space station, to keep us up there longer and do more work." In addition to the new storage facilities, Columbia will have installed a new drag chute, stronger brakes and an improved nosewheel steering system. Discovery and Atlantis will be overhauled in 1992 and 1993 respectively. [Halvorson, FLORIDA TODAY, pp. 1A-2A, Aug. 9, 1991, KSC SHUTTLE STATUS REPORT, 12:30 p.m., Aug. 9, 1991, "Weather Delays Columbia's Calif. Trip Until Today," FLORIDA TODAY, p. 6A, Aug. 10, 1991.]

STS 48/UARS PROCESSING

Main Propulsion System checks on Discovery have been completed as have liquid hydrogen and liquid oxygen fill and drain leak checks and the Orbiter and External Tank were electrically mated. The Shuttle Interface Test is underway as are a retest of the Master Events Controller, the final Orbiter/External Tank mate and umbilical closeouts and liquid hydrogen recirculation pump leak checks. Platform retractions are scheduled to begin tonight and rollout to Launch Complex 39A will begin at 12:01 a.m. August 12. [KSC SHUTTLE STATUS REPORT, Aug. 9, 1991.]

ENDEAVOUR'S STS 49 PROCESSING

Electrical power up operations have been completed on Endeavour (OV 105); they were begun yesterday for the first time as a member of the Shuttle Fleet. The payload bay doors were opened last night as well. Freon coolant loop service has begun and inspections of drag chute modifications are also underway. Technicians are cleaning and inspecting the RTLS (Return to Launch Site) dump line and the main propulsion system. Electrical system validations are scheduled. [KSC SHUTTLE STATUS REPORT, Aug. 9, 1991.]

INTERNATIONAL MICROGRAVITY LABORATORY (IML)

A pre-move review of the IML Spacelab module was held earlier this week at KSC, and a consensus was reached to proceed with plans to move the IML payload to a test stand where it will undergo many of the final portions of its pre-flight processing. IML is now positioned in the Operations & Checkout Building's Test Stand III. On August 14, IML is scheduled to be hoisted by a crane and placed into an adjoining test area where more extensive checkouts can be conducted. IML will fly aboard the Space Shuttle Discovery on STS 42, now targeted for

launch in January 1992. [INTERNATIONAL MICROGRAVITY LABORATORY (IML) STS 42 PROCESSING STATUS UPDATE, Aug. 8, 1991.]

PLAYALINDA BEACH CLOSURE

Playalinda Beach will be closed to visitors for a few hours August 12 as the Orbiter Atlantis makes a planned landing at Kennedy Space Center's Shuttle Landing Facility. The beach will close at 8:00 p.m., its normal time, but not reopen until an hour after landing which is scheduled for 8:24 a.m. [NASA/KSC RELEASE NO. 98-91, Aug. 9, 1991.]

August 10:

COLUMBIA'S FERRY FLIGHT BEGINS

Columbia, attached to its Shuttle Carrier Aircraft, left Kennedy Space Center today at 10:48 a.m., accompanied by a NASA Gulfstream jet. It spent the night at MacDill Air Force Base (Tampa, FL). [Brown, FLORIDA TODAY, p. 1A, Aug. 11, 1991, "Space Shuttle Columbia Has a Layover in Tampa," THE ORLANDO SENTINEL, Aug. 11, 1991.]

JONES MADE SI DIRECTOR

Kennedy Space Center Director **Forrest S. McCartney** today named **Marvin Jones** to be Director of Center Support Operations. Jones had been Deputy Director and Acting Director since the death of **Jim Rice** on June 12. "We are very fortunate to have someone with Marv's experience and ability to take over for Jim Rice," McCartney said. Jones (Merritt Islands, FL) joined NASA in 1985 when he managed KSC's security and safety, reliability and quality divisions. He had served as Rice's deputy since January 1990. Prior to joining NASA, Jones had been Commander at Patrick Air Force Base and retired with the rank of Colonel. ["Former Commander Gets New NASA Job," FLORIDA TODAY, Aug. 11, 1991.]

MDSSC AWARD WINNERS

Five employees of McDonnell Douglas Space Systems Co. have been awarded Manned Flight Awareness Program awards. These are: **Dena Pierce**, Materials Coordinator; **Arthur Culberson**, Safety Engineer; **Kimberly Serfozo**, Associate Project Support Analyst; **Throm, Ronald**, System Technician; **Margo Collier**, Financial Controls and Accounting Department. ["NASA Gives Honors to Contractor Employees," FLORIDA TODAY, Aug. 11, 1991.]

MORE TESTS FOR SPACE MIRROR

"We'll announce an opening date when we're satisfied the tests agree with our initial assessment" that there was no damage, said **Randy Barridge**, a board member of the Astronauts Memorial Foundation. The three-month old "Space Mirror," the Astronauts Memorial, will be closed for more tests and inspections, officials said today. [Brown, FLORIDA TODAY, p. 2B, Aug. 10, 1991.]

August 11: **ATLANTIS MAKES GRACEFUL LANDING**

At 8:23 a.m. this morning, preceded by twin sonic booms, the Space Shuttle Atlantis glided easily to a landing at Kennedy Space Center's Shuttle Landing Facility. "Welcome home Atlantis and congratulations on a picture-perfect mission," Spacecraft Communicator **Bob Cabana** greeted the crew. The crew emerged from the Orbiter an hour after landing; they were greeted by KSC Director **Forrest S. McCartney**, Shuttle Launch Director **Robert B. Sieck** and Shuttle Program Director **Robert L. Crippen** and then boarded a van to be taken to their medical checkups. The flight's only problem had been the overheating of an auxiliary power unit - one of three - used to power hydraulic systems during launch and landing. None of the units presented problem during the landing, but the crew delayed turning on one unit to avoid its overheating.
Crippen said that preliminary inspections showed minor tire wear on one of the four main landing gear wheels. He was referring to one tire which "did show some wear on the cords." He also said the sees no need to smooth the landing strip, "I'm happy with it the way it is." Nevertheless, Crippen said he expected landings to occur at Edwards Air Force Base about 60 percent of the time. Speaking for the crew Commander **John Blaha** said, "We're really happy to be back. Atlantis gave us no problems." After their checkups, the Atlantis crew - Blaha, Pilot **Michael Baker** and Mission Specialists **James Adamson, G. David Low** and **Shannon Lucid** - the crew showered and boarded a NASA plane for a flight to Houston.

NASA had been concerned about the landing to the extent that guests had been banned and the number of media representatives was limited at a special viewing site near the runway. Managers thought toxic fumes blowing toward the viewing site might be a danger to spectators and had prepared 200 oxygen masks in case of an emergency. No toxic gases were detected, though fans were in use as part of routine post-landing procedures. Atlantis was towed to its processing hangar at 3:00 p.m. so preparations could begin for a planned November flight to deploy a military satellite. At the Orbiter Processing Facility, the crew module was opened, the doors were removed from the aft compartment and access to the vehicle was established. Tomorrow activities will include post-flight operations to safe the pyrotechnics on the vehicle and preparations to offload residual propellants from the power reactant storage and distribution system tanks. [Brown, FLORIDA TODAY, pp. 1A-2A, Aug. 12, 1991, KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 12, 1991, "Mission Accomplished for Atlantis," USA TODAY, p. 3A, Aug. 12, 1991, Rohter, THE NEW YORK TIMES, p. A10, Aug. 12, 1991, Date, THE ORLANDO SENTINEL, pp. A-1 & A-4, Aug. 12, 1991.]

August 12: **RUNWAY REPAIRS BEGIN**

Goodson Paving Inc. (Cocoa, FL) will begin a $350,000 project to resurface each end of the space center's aging Shuttle Landing Facility. Early next year a $4 million project to repair the facility's shoulders and upgrade lighting will begin. **David Wentworth**, Project Manager in KSC's Engineering Development Directorate, said that rainwater loosened and broke up the runway material over time.

"Normally, this type of surface is not a problem. But in the case of the Orbiter, with its tiles and tires and it coming in so hot, you can damage the tiles or possibly pop the tires," he said. Since the material would simply break up again, repairing the overruns won't help; managers have decided to put down a new surface, Wentworth said. [Banke, FLORIDA TODAY, pp. 1A-2A, Aug. 12, 1991, NASA/KSC RELEASE NO. 97-91, Aug. 12, 1991.]

DISCOVERY READY FOR ROLLOUT

Technicians have readied Discovery for rollout this morning, one month before projected launch date - September 12 - for the STS 48 mission. Discovery's cargo, the Upper Atmosphere Research Satellite (UARS), was moved out to Launch Complex 39A last week. The UARS will be installed in the Orbiter's cargo bay August 14 and will then be tested to ensure the spacecraft is working in concert with Discovery. The Shuttle's five-man crew will come to KSC this weekend for the Terminal Countdown Demonstration Test August 19-20. The STS 48 crew includes Commander **John Creighton**, Pilot **Kenneth Reightler**, and mission specialists **James Buchli**, **Mark Brown** and **Charles "Sam" Gemar**. Meanwhile, Columbia aboard the SCA, will try to fly as far as San Antonio, TX, today from MacDill Air Force Base (Tampa, FL). Bad weather had interrupted the ferry flight yesterday. [Banke, FLORIDA TODAY, p. 2A, Aug. 12, 1991, KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 12, 1991.]

ROLLOUT OF STS 48

Discovery was rolled out to Launch Complex 39A beginning at 1:37 a.m.; the vehicle was harddown at 9:19 a.m. Rollout was delayed an hour and a half because of thunderstorms in the area; weather rules required that the Shuttle not be moved if the chance of lightning within 20 miles is greater than 10 percent, according to KSC spokesman **Bruce Buckingham**. "Once we got under way, the rollout went extremely well," Buckingham said. At the pad technicians were occupied making connections between the vehicle, launch platform and the launch pad. There will be a hot firing of auxiliary power unit no. 3 tonight. Work scheduled includes: rotation of the service structure around the vehicle early tomorrow, installation of the UARS payload August 14, helium signature leak test of the main propulsion system and three Shuttle Main Engines August 15 and the Countdown Demonstration Test August 19-20. [KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 12, 1991, Banke, FLORIDA TODAY, p. 1A, Aug. 13, 1991.]

COLUMBIA'S FERRY FLIGHT CONTINUES

Columbia departed MacDill Air Force Base (Tampa, FL) at 9:30 a.m. today enroute for Kelly Air Force Base (San Antonio, TX). Ferry flight officials will evaluate the weather from Texas to California before making a decision on the next leg of the ferry flight. An engine problem on the pathfinder aircraft and adverse weather conditions have delayed the cross-country ferry flight. The escort jet will either be repaired or replaced and the ferry flight is expected to continue at 8 a.m. August 13. [KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 12, 1991, Banke, FLORIDA

TODAY, p. 1A, Aug. 13, 1991.]

[] ENDEAVOUR PREPARATIONS

Technicians continue to make preparations for Endeavour's maiden flight - STS 49. Platforms have been installed in the Orbiter's midbody. Validations of the electrical system are also underway as are the adjustment of payload bay door latches. Leak checks are being made of the ammonia system; the instrumentation system is being verified and the main propulsion system is being checked. [KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 12, 1991.]

[] SPACE MIRROR: NO STRUCTURAL DAMAGE

The Astronauts Memorial is not structurally damaged, but it will remain closed until later this week, according to officials. Workers will repair damaged screw which hold white panels to the rear of the memorial and they will operate the mirror for a day before reopening the Space Mirror to the public, according to **David Walsh** of the Astronauts Memorial Foundation. ["Memorial Damage Not Structural," FLORIDA TODAY, p. 1B, Aug. 13, 1991, Date, THE ORLANDO SENTINEL, Aug. 13, 1991.]

[] ATLANTIS IN FINE SHAPE

Robert Hill, a NASA manager, said that the Space Shuttle Atlantis will require little in the way of repair work. He said that four tiles must be replaced as well as a layer of haze which clouded two of Atlantis' six main cockpit windows. One of the vehicle's tires was worn slightly, but officials expressed little concern. Hill said, "The bottom line is KSC is back in the landing business, and we're glad to see it," Hill said. [Banke, FLORIDA TODAY, p. 1A, Aug. 13, 1991, Date, THE ORLANDO SENTINEL, Aug. 13, 1991.]

August 13: ATLANTIS: FUEL CELL CONCERNS

Following power down procedures at about 4:00 a.m. August 12, fuel cells 2 and 3 were inadvertently left operating. The error was not noticed until about 5:00 p.m. and may result in replacement of the cells. Two of the three $7 million cells will be replaced. According to NASA Manager **Robert Hill**, "There's no real fear we have done any damage to them; we just want to be very careful." NASA is concerned that water from the cells may have backed up into the unit, potentially causing damage. Technicians discovered the problem when they were working in the crew cabin and heard a fan running when it should have not have been. According to KSC spokesman **Bruce Buckingham**, Orbiter power had been turned off at 4 o'clock on the morning of August 12, when an excess of gaseous helium was discovered to have entered the fuel cell system from a ground line which had been overpressurized. A momentary power drop occurred in the cells' electrical output, so engineers ordered an emergency power-down of the Orbiter. The method used to shut down the power inadvertently prevented the two suspect fuel cells from shutting down their electricity generating capacity. Buckingham said,

"We are concerned about the possible damage to the fuel cells and why the procedures allowed this to happen, but at no time was there any danger to the Orbiter." The 255-pound fuel cells will be removed and shipped to their manufacturer, International Fuel Cells Division of United Technologies (South Windsor, CT). Replacement with spare fuel cells is not expected to delay the projected November 19 launch of Atlantis' STS 44 mission. Meanwhile, crew module items have been destowed from the Orbiter. Technicians are at work on main engine drying operations, hypergolic fuel deservicing and cryogenic fuel offload preparations. [KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 13, 1991, Banke, FLORIDA TODAY, p. 2A, Aug. 14, 1991.]

[] **STS 48 PRE-LAUNCH STATUS**

After rolling out to Launch Complex 39A yesterday, Discovery was powered up and an auxiliary power unit was hot fired. Technicians are currently working on launch pad validations and rotating the service structure around the vehicle. Scheduled for completion: opening the payload bay doors, installing the payload August 14 and conducting a helium signature test of the main propulsion system. [KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 13, 1991.]

[] **COLUMBIA FERRY UPDATE**

The Space Shuttle Columbia departed Kelly Air Force Base (San Antonio, TX) at 9:34 a.m. EDT yesterday and arrived at Palmdale, CA, at 1:25 p.m. EDT. Columbia has been demated from the 747 Carrier Aircraft and was towed into the Rockwell Facility where it will spend the next six months being modified and inspected. [KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 13, 1991, KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 14, 1991.]

[] **STS 49: ENDEAVOUR UPDATE**

Water flex lines have been installed on the Space Shuttle Endeavour; inspections of the Orbiter's drag chute modifications are underway. Technicians have begun freon coolant loop service, main propulsion system inspections and electrical system validations. The vehicle is presently in the Orbiter Processing Facility's High Bay 1. [KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 13, 1991.]

August 14: **FUEL CELL INVESTIGATION BOARD**

Kennedy Space Center Director **Forrest S. McCartney** has appointed a board to investigate the circumstances surrounding the August 12 mishap which involved possible damage to two of Atlantis' three fuel cells. Atlantis is presently located in Bay 2 of the Orbiter Processing Facility. The Orbiter landed at KSC August 11 to complete its nine-day STS 43 mission. **Jack Smith**, Director of Safety and Reliability, is designated as chairman of the board. Other board members are: **Harvey Crawford**, Chief of Fuel Cell Systems Section in the Vehicle Engineering Directorate; **Stephen Francois**, Deputy Director of Space Shuttle Payload Operations; **Albert Sofge**, Shuttle Test Director, Shuttle Operations; and **Thomas**

Williams, Chief of Shuttle Electrical and Telecommunications Systems Division in the Vehicle Engineering Directorate. Board functions include investigating the facts surrounding the mishap, determining its probable cause, assessing the possibility of a recurrence and recommending corrective actions. A final report is due by early October. Advisors appointed to the board are: **Alan Gettleman**, representing the Payload Safety Branch in the Safety and Reliability Directorate; **Dudley Cannon** from the Chief Counsel's office; **Lisa Malone** from the Public Affairs Office; and **Michael Generale** from the Engineering Branch of the Shuttle Logistics Project Management Directorate. The two fuel cells will be removed from their location in the midbody of the Orbiter next week and shipped to the vendor [See story dated August 13] where the extent of the damage, if any, to the units will be determined. The three fuel cells operate as independent electrical power sources fed by oxygen and hydrogen reactants. Power and water are produced through the chemical reaction that takes place in these power plants. Each cell measures 14 inches high, 15 inches wide and 40 inches long. Each weighs 255 pounds and is capable of supplying 12 kilowatts peak and 7 kilowatts of maximum continuous power. [NASA/KSC RELEASE NO. 99-91, Aug. 14, 1991, Brown, FLORIDA TODAY, p. 4A, Aug. 15, 1991, Date, THE ORLANDO SENTINEL, Aug. 15, 1991.]

[] **STS 48: DISCOVERY PREPARATIONS**

Discovery received its major cargo at Launch Complex 39A today: the Upper Atmosphere Research Satellite was loaded into the Orbiter's payload bay in preparation for the five-day STS 48 mission scheduled for September 12. Tomorrow technicians will conduct a routine leak test of Discovery's main engines; next week, a Terminal Countdown Demonstration Test will occur and the crew will participate. The STS 48 crew is expected to arrive at KSC on August 18 for the test and to familiarize themselves with the emergency egress system. [Brown, FLORIDA TODAY, p. 4A, Aug. 15, 1991.]

August 15: **DISCOVERY LAUNCH: SEPT. 12**

The STS 48 mission will begin with launch at 6:57 a.m. September 12, according to current planning at Kennedy Space Center. "We're about ready to go and in less than a month we'll be on our way," said Discovery Mission Specialist **James Buchli**. The Orbiter is expected to land at KSC at 1:55 a.m. September 18. Commander **John Creighton** noted, "I think there's a little higher risk landing at night than in daytime, but that's true of all airplanes." Pilot **Kenneth Reightler** added, "If we didn't think it's safe, we wouldn't be flying there." The other members of the crew are Mission Specialists **Charles "Sam" Gemar** and **Mark Brown**. The mission's primary job will be to study the Earth's atmosphere and Program Scientist **Joe McNeal** calls it "a new era in the study of our global environment." The Upper Atmosphere Research Satellite that the crew will launch is expected to provide atmospheric data for two years. The five-member STS 48 crew will fly to the space center August 18. [Banke, FLORIDA TODAY, p. 6A, Aug. 16, 1991.]

[] SOVIET ROCKET CARRIES U.S. DEVICE

A Soviet Cyclone rocket launched today at 5:15 a.m. EDT carrying a NASA-built Total Ozone Mapping Spectrometer (TOMS) which is designed to monitor holes in the ozone layer of the Earth's atmosphere. The liftoff came from Plisetsk Cosmodrome in northern Russian and carried a Soviet Meteor-3 Satellite which will also measure the ozone layer. NASA wants to have an ozone-monitoring device in orbit continually, according to **Stanley Way**, the agency's Deputy Manager for the project. The data gained from the mission will be jointly shared between Soviet and U.S. scientists. ["Soviet Rocket Carrying U.S. Device Blasts Off," FLORIDA TODAY, p. 6A, Aug. 16, 1991.]

August 16: STS 48/DISCOVERY STATUS

A helium signature leak test of the Discovery's three main engines and main propulsion system have been completed. Technicians have also completed connections between the Upper Atmospheric Research Satellite (UARS) and the Orbiter and have replaced Tacan no. 1. Preparations have begun to service the vehicle with hypergolic propellants and to retest the Tacan antenna. Shortly, technicians will conduct purge tests of the cavity between the 17-inch external tank disconnect and the Orbiter. They will also be applying protective foam that hardens around the liquid hydrogen recirculation pump package located in the aft compartment. Scheduled work includes: payload interface verification tests (August 17), the Countdown Demonstration Test (August 19-20) and loading hypergolic propellants into the Orbiter's storage tanks next week. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 16, 1991.]

[] ATLANTIS POST-FLIGHT PROCESSING

Atlantis' payload bay doors have been opened and its Ku-band antenna has been deployed. Technicians have installed protective covers over the Orbiter's radiators and offload lubricating oil from the auxiliary power units. Post-flight inspections of the vehicle continue as do preparations to offload residual hypergolic propellant from the Orbiter's storage tanks. Workers are electrically disconnecting the Shuttle Solar Backscatter Ultraviolet (SSBUV) payload from the Orbiter and they have begun to remove the Space Station Heat Pipe Advanced Radiator Element-II (SHARE) from the Orbiter's payload bay. The vehicle's waste management system has also been removed. More payload items are still to be removed from the cargo area and checks must be made of the vehicle's navigation aids. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 16, 1991.]

[] WORK ON ENDEAVOUR CONTINUES

A functional test of Endeavour's payload bay doors has been scheduled for next week in OPF Bay 1. Workers are removing the simulator fuel cells from the Orbiter and are validating the electrical system. Checks of the main propulsion system are under way; the instrumentation system is being verified. Checks of all

the Orbiter systems are being made in preparation for the first flow processing. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 16, 1991.]

DISCOVERY: LEAK TEST CONTINUED

With an eye cocked in the direction of Tropical Storm Bob, technicians at Kennedy Space Center completed a leak test of Discovery's three main engines in preparation for the Orbiter's STS 48 mission. "There were no problems. Everything looks good," said KSC spokesman **Bruce Buckingham.** Onboard fuel storage tanks will be filled with propellant next week. The five-member crew arrives next week, too, to participate in the Terminal Countdown Demonstration Test (TCDT), receive training in emergency egress from Launch Complex 39A and attend briefings about the mission. ["Workers Test Discovery's Engines," FLORIDA TODAY, p. 2A, Aug. 17, 1991.]

ASTRONAUT MEMORIAL TO REOPEN

The Astronauts Memorial opened today at 9:00 a.m., having been closed the past two weeks for repair of a potential safety hazard. "It's great to have this behind us," said **David Walsh,** Astronauts Memorial Foundation board member. "With anything new you're going to have some glitches, and this one turned out to be minor. Hopefully, we won't have any more problems in the future." Once engineers determine what caused cracks in four of the Space Mirror's granite stones, they will be replaced. The cracks were unrelated to the malfunction in the mirror's swivel mechanism." [Banke, FLORIDA TODAY, p. 1B, Aug. 17, 1991, "Space Mirror Repaired, Will Reopen This Weekend," THE ORLANDO SENTINEL, Aug. 17, 1991.]

August 17:

SPACELAB READY FOR USE

The Spacelab module, used during Columbia's June mission (STS 40) has been disassembled by Kennedy Space Center workers. **Mitch Varnes,** KSC spokesman, said, "The experiments have been returned to their principal investigators and the hardware elements of the module have been turned over to the KSC processing teams." The next use of the Spacelab's tunnel will be for the International Microgravity Laboratory mission scheduled for January 1992; the pressure shell of the Spacelab will be used in the spring of 1992 for the U.S. Microgravity Laboratory mission. ["Spacelab Ready for Use," FLORIDA TODAY, p. 10E, Aug. 18, 1991.]

3RD OPF BAY TO OPEN

"It's going to be the bay to operate in," said **Ken Geiler,** Activation Project Office Director for Lockheed Space Operations Co. "The technicians that have been over there so far just love it." Geiler referred to the September 1 opening of KSC's third Orbiter Processing Facility work bay. The Space Shuttle Columbia, oldest member of the Orbiter fleet, spent one day in the facility before being flown to California for extensive modifications. The Space Shuttle was moved there for

technicians to check how well an Orbiter would fit within the facility. "There were no surprises when Columbia went in," said Geiler. Workers did note that some equipment in the facility protruded uncomfortably close to Columbia and that will be taken care of. The third OPF is actually the converted Orbiter Maintenance and Refurbishment Facility and houses equipment ferried from the moth-balled Shuttle facility at Vandenberg Air Force Base. Geiler said, "We transferred thousands of items out here. To see that equipment come back here and finally be utilized in the Shuttle program is a personal as well as a professional achievement." The OMRF was modified by Lockheed contract at a cost of $85 million; a completely new facility would have cost $170 million to construct. [Banke, FLORIDA TODAY, pp. 10E & 9E, Aug. 18, 1991, Memorandum dated Aug. 14, 1991, General Distribution, Subject: Area Permit Badging for Orbiter Processing Facility High Bay 3 (OPF H/B 3).]

August 18: **STS 48 CREW ARRIVES AT KSC**

The five-member crew of Discovery's STS 48 mission arrived today to take part in a TCDT, emergency egress training and mission briefings. Mission Specialist **Mark Brown** said, "It's always a pleasure to be in Florida - especially when the hurricane's (Bob) going someplace else." Fellow Mission Specialist **Charles "Sam" Gemar** said, "We have a healthy satellite, we've got a healthy Orbiter, and we're looking forward to putting this baby in orbit." The crew also includes veteran Mission Specialist **James Buchli**, Commander **John Creighton** and Pilot **Ken Reightler**. The commander and pilot will practice KSC landings in a Shuttle Training Aircraft. The STS 48 crew will be at Kennedy Space Center through Tuesday (August 20). [Crew Photograph, FLORIDA TODAY, p. 1A, Aug. 19, 1991, Brown, FLORIDA TODAY, p. 8A, Aug. 19, 1991.]

August 19: **W & J CONSTRUCTION CONTRACT**

W & J Construction Corp. (Cocoa, FL) will resurface about 1.5 miles of roadway on Kennedy Space Center and perform additional work at the KSC Prototype Lab in fulfillment of a $309,645 contract. The company will resurface and repaint swatches of the NASA Parkway, beginning later this month with a portion of the overpass west of the Headquarters Building. Afterward in the Industrial Area, segments of C, D and E Avenues will temporarily become single lanes while the paving is repaired. W & J also will install paving additions at the Prototype Lab located south of the Operations and Checkout Building. [NASA/KSC Release No. 101-91, Aug. 19, 1991.]

SAFETY SUPPORT CONTRACT

NASA at Kennedy Space Center has entered into the final negotiations with Hernandez Engineering Inc. (Houston, TX) for a new Safety Support Contract worth $6.5 million. The contract runs for two years and may have price options for an additional two years. Hernandez is to provide technical and engineering services in support of KSC's Safety, Reliability and Quality Assurance Directorate. The company's primary responsibilities will relate to flight and ground hardware

processing, and will involve independent safety assessments and analyses.Hernandez replaces Ebon Research Systems which has held the contract since 1986; most of Ebon's 46 employees will be hired by Hernandez, according to **Wesley H. Dean**, Director of Procurement, Center Support Operations at KSC. Both Hernandez and Ebon are minority-owned small businesses; Ebon has graduated from the Section 8A program, which has a seven-year limit, under the Small Business Administration Act. This is the first time at KSC that a Section 8A contract will be awarded on a competitive basis, Dean said. The other, unsuccessful, bidders were CEXEC Inc., (McLean, VA); Creative Management Technology Inc. (Cocoa Beach, FL) and ETC Technical and Professional Services Inc. (Oklahoma City, OK). [NASA/KSC Release No. 103-91, Aug. 19, 1991, "Firm Clinches Contract," FLORIDA TODAY, p. 10E, Aug. 25, 1991.]

GLOBE COMMUNICATIONS CONTRACT

Globe Communications Inc. (Durham, NC) has been awarded a fixed priced contract worth $889,557 to install new communication lines between three Kennedy Space Center facilities. The company will install audio and fiber optic cable between the central communications center at KSC, the Communications Distribution and Switching Center, the Tel IV Central Telemetry Station in the south area of the space center. The fiber optic cable replaces the older copper cable used previously. Globe will also install audio and fiber optic cable to link the Communications Distribution and Switching Center with the Canister Cleaning and Rotation Facility now under construction in the KSC Industrial Area. [NASA/KSC Release No. 102-91, Aug. 19, 1991.]

SPEEGLE CONSTRUCTION CO. CONTRACT

Speegle Construction Corp. (Cocoa, FL) will provide two buildings and upgrade the area on Contractors Road where heavy equipment is restored under a $523,950 contract at Kennedy Space Center. The company will provide labor, equipment and materials to furnish the two pre-engineered metal buildings, and associated services involving the exterior lighting, parking area, concealed fasteners and ceramic tile wainscotting. An old shed on the property will be razed; the area, which is located north of the Roads and Grounds Building and is operated by Lockheed Space Operations Co., was dedicated August 12. [NASA/KSC Release No. 100-91, Aug. 19, 1991.]

KSC FACES POSSIBLE LAYOFFS

NASA's manager have been drawing up plans to absorb cutbacks which are likely to occur when Congress passes the space agency's budget. That budget is expected to be up to $1 billion less than NASA asked Congress for. **Hugh Harris**, Deputy Director of Public Affairs at Kennedy Space Center, said "It's premature to talk about layoffs since a number of decisions haven't been made yet - mainly what NASA's budget is going to be. We're not excluding any options. No decision has been made, nor will any be made until Congress completes its work and we know where we stand and what we have to work with." Lockheed Space

Operations Co. spokesman J. B. **Klump** acknowledged that "we've been asked to give NASA options to cut costs. Reductions in the work force was among several suggestions." Lockheed, with 6,700 workers, is the biggest employer at KSC. [Brown, FLORIDA TODAY, p. 1A, Aug. 20, 1991.]

[] **TERMINAL COUNTDOWN DEMONSTRATION TEST**

Discovery's STS 48 Commander **John Creighton** said, speaking of today's Terminal Countdown Demonstration Test, "It's sort of a dress rehearsal for the real event. It's very similar to the real thing except we don't start the main engines when we get down to T-minus-zero." The TCDT started this morning and will be completed August 20. In the early portion of the test, the crew attended mission briefings participated in training exercises including emergency egress from the launch tower and practicing night landings. The crew also includes Pilot **Ken Reightler** and Mission Specialists **Mark Brown, James Buchli** and **Charles "Sam" Gemar**. STS 48 is planned to end in the first ever night landing at Kennedy Space Center. [Halvorson, FLORIDA TODAY, p. 6A, Aug. 20, 1991.]

August 20: **STS 48: PREPARATIONS CONTINUE**

The five-member crew of STS 48 made a sharp edge inspection of the payload bay yesterday and were briefed today on emergency escape procedures at the launch pad, slidewire and bunker. The Terminal Countdown Demonstration Test ended at 11 a.m. with a simulated main engine cutoff; the astronauts are expected to return to Houston this afternoon. Preparations are underway to service Discovery with hypergolic propellants; calibration of the inertial measurement units has also begun. The payload bay doors will be closed tonight in preparation for hypergolic loading operations which begin tomorrow. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 20, 1991.]

[] **TIRES REMOVED FROM ATLANTIS**

Workers in OPF Bay 2 have removed the tires from the Space Shuttle Atlantis and are scheduled to remove carrier panels and heat shields this week. Other work in progress on the Orbiter includes post-flight (STS 43) inspections of the vehicle, preparations to offload residual hypergolic propellant from the Orbiter's storage tanks, troubleshooting the cabin vent valve, preparations to remove fuel cells no. 2 and 3, inspections of spare fuel cells in preparation for installation and main propulsion system tests. In addition, technicians will be engaged in main engine drying operations, post-flight inspections of the thermal protection system and the removal of payload equipment from the payload bay. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 20, 1991.]

[] **STS 49: ENDEAVOUR PREPARATIONS**

A functional test of the payload bay doors of Endeavour is scheduled to occur this week in OPF Bay 1. Work in progress includes: rigging the payload bay doors, preparing the freon coolant loop for servicing, validations of the electrical system,

tests of the main propulsion system gaseous oxygen system, verification of the instrumentation system, checks of all Orbiter systems for first flow processing, test and repair of orbital maneuvering system pods at the Hypergolic Maintenance Facility. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 20, 1991.]

MIXED FLEET MANIFEST ISSUED

Today NASA issued its semi-annual Payload Flight Assignments - NASA Mixed Fleet Manifest, providing the latest schedules for payloads to fly on the Space Shuttle and on expendable launch vehicles (ELVs). The Shuttle schedule for the remainder of 1991 has the Upper Atmosphere Research Satellite mission (STS 49) being accelerated to September 1991 and the Defense Support Program (STS 44) planned in December. In 1992, 8 Shuttle missions are planned. International Microgravity Laboratory-1 (STS 42) will lead off the year, followed by Atlas-1 (STS 45), the Intelsat Reboost mission (STS 49), U.S. Microgravity Laboratory-1 (STS 50), Tether Satellite System/European Retrievable Carrier-1 (STS 46), Spacelab J (STS 47), Laser Geodynamics Satellite II/U.S. Microgravity Payload/CANEX-2 (STS 52), and a DOD mission (STS 53). Highlights in 1992 will include the first flight of the Shuttle Endeavour on STS 49 and the return of Columbia to flight status on STS 50 which is planned to be the first 13 day extended duration mission of the Space Shuttle Program. Several missions in 1992 will feature international collaboration and flights of foreign payload specialists including a European and a Canadian on STS 42, an Italian on STS 46, a Japanese on STS 47 and a Canadian on STS 52. Astro-2 has been added to the manifest in September 1994. This August manifest projects out through Fiscal Year 1997, which ends September 1997. Among the missions planned in that time frame are Shuttle assembly and utilization flights to complete the man-tended configuration of Space Station Freedom and to begin using the facility, a second visit to the Hubble Space Telescope, Atlas-5, Spacelab E-2 and Spacehab-8/U.S. Microgravity Payload-8. Two ELV launches remain in 1991 - the NOAA-1 weather satellite on an Atlas E rocket and the Extreme Ultraviolet Explorer on a Delta II vehicle. Five ELV launches are planned in 1992, including the joint U.S.-Japan Geotail mission in July and the Mars Observer in September. The Expendable Launch Vehicle manifest has been modified by the delay of the GOES I/J missions to December 1992 and August 1993, respectively. The ELV manifest now includes flights through September 1997 (FY 1997). [NASA/KSC Release No. 91-132, Aug. 20, 1991, Halvorson, FLORIDA TODAY, p. 9A, Aug. 21, 1991.]

BUDGET THREAT TO MARS PLAN

Air Force Col. **Frank Stirling** said today that Congress has proposed cutting the $1.2 billion Titan budget request by one-third. "That could pose a serious problem for us if we don't get that money restored," he said. "It would have fairly substantial impact across the program, including our ability to support Mars Observer." The Mars Observer is a NASA program scheduled for a September 1992 launch aboard a Commercial Titan rocket from Launch Complex 40 at Cape Canaveral Air Force Station. LC 40 is the only pad capable of handling the launch and is currently being extensively modified; a budget cut could seriously delay the

renovations, Stirling said. "Right now we're doing everything we can to get Launch Complex 50 on line. It's going to be tight, but we still think we can make it," he said." [Banke, FLORIDA TODAY, p. 9A, Aug. 21, 1991.]

August 22: **DISCOVERY: ONBOARD TANKS FILLED**

At Launch Complex 39A, the Space Shuttle Discovery's onboard storage tanks have been filled with propellants in preparation for its STS 48 mission scheduled for September 12. The reaction control system's storage tanks were loaded with monomethylhydrazine. Oxidizer was loaded into the Orbiter's orbital maneuvering system tanks and hydrazine will be loaded into tanks for the Orbiter's auxiliary power units and for the solid rocket boosters' hydraulic power units. After the propellant loading, the pad was reopened briefly, then closed again for another hazardous operation August 24 when technicians install explosive devices, said Kennedy Space Center spokesman **Bruce Buckingham.** The payload bay doors were closed today at 10:10 a.m. A Launch Readiness Review is scheduled for August 26 and a Flight Readiness Review is scheduled for August 28-29. [Brown, FLORIDA TODAY, p. 8A, Aug. 23, 1991, KSC SHUTTLE STATUS REPORT, 11 p.m., Aug. 22, 1991.]

[] **ATLANTIS: STS 44 PROCESSING**

Workers have deserviced freon from Atlantis' freon coolant loop and tests of the radar altimeter and heads up display have also been completed. The auxiliary power units will be deserviced this weekend. Work in progress includes: post-flight inspections of the Orbiter, removing and replacing fuel cells no. 2 and 3 - the old units will be shipped to their manufacturer for analysis while an investigation of the mishap regarding them continues. Also in progress are main propulsion system tests, removal of heat shields, shuttle main engine drying operations and post-flight inspections of the thermal protection system. [KSC SHUTTLE STATUS REPORT, 11 p.m., Aug. 22, 1991.]

[] **STS 49 PROCESSING**

A functional test of Endeavour's payload bay doors has been completed; the Orbiter's radiators will be tested next week. Work in progress includes: inspections of the vehicle's radiators, removal and replacement of the potable water lines, preparing the freon coolant loop for servicing, validations of the electrical system, tests of the main propulsion system gaseous oxygen system, verification of the instrumentation system, checks of all orbiter systems for first flow processing and testing and repair of orbital maneuvering system pods at the Hypergolic Maintenance Facility. [KSC SHUTTLE STATUS REPORT, 11 p.m., Aug. 22, 1991.]

August 23: **STS 48 STATUS REPORT**

Hypergolic propellants have been loaded into Discovery's onboard storage tanks for the reaction control system and the orbital maneuvering system. Hydrazine

was loaded into tanks for the vehicle's auxiliary power units and for the solid rocket booster's hydraulic power units. Launch Complex 39A will be opened tomorrow morning at 6 a.m. when preparations begin for installing ordnance. Work scheduled includes: the end-to-end testing of the Upper Atmosphere Research Satellite (UARS), the Launch Readiness Review begins August 26. On August 27 a flight readiness test will be conducted to cycle the Orbiter's main engine valves and calibrate engine sensors. A flight readiness review is planned for August 28-29; aft compartment closeouts begin next week. [KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 23, 1991, Banke, FLORIDA TODAY, p. 7A, Aug. 24, 1991.]

STS 44 STATUS REPORT

Fuel cells number 2 and 3 have been removed from Atlantis and will be shipped to the vendor for analysis and any necessary repair. The heat shields have been removed from around the main engines. Underway is the installation of equipment needed to remove the Orbiter's radiators; post-flight inspections of the vehicle; main propulsion system tests; main engine drying operations and post-flight inspections of the thermal protection system. Scheduled for completion is the deservicing of the auxiliary power units this weekend; removal of the three main engines and the radiators next week. [KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 23, 1991.]

STS 49: ENDEAVOUR STATUS REPORT

A functional test of Endeavour's payload bay doors has been completed; a functional test of the Orbiter's radiators is scheduled for next week as is the removal of the fuel cell simulators. Inspections of Endeavour's radiators are currently ongoing. Other work in progress includes: removal and replacement of a few of the potable water lines which are located in the middeck below the flooring; preparations to remove the fuel cell simulators; validations of the electrical system; preparing the freon coolant loop for servicing; tests of the main propulsion system gaseous oxygen system; verification of the instrumentation system; repair of the two orbital maneuvering system pods at the Hypergolic Maintenance Facility. [KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 23, 1991.]

LOCKHEED ANNOUNCES LAYOFFS

The Shuttle Processing Contractor, Lockheed Space Operations Co., announced today that it will begin to layoff 400 workers in two to three weeks. All cuts will be completed by mid-October, according to spokesman **J. B. Klump**. The exact positions to be eliminated have not yet been determined; that will depend in part on haw many employees choose to leave voluntarily. Klump said, "We don't expect any adverse impact on our ability to meet Shuttle schedules. Orbiter technicians will be minimally impacted." Subcontractors Thiokol Corp., Grumman Corp. and Johnson Controls Inc. will also be impacted. The layoffs are expected to save Kennedy Space Center $15 to $20 million of the $50 million shortfall for the fiscal year beginning in October, said Center Deputy Director **Gene Thomas**.

"We're not promising there won't be any more layoffs, but we hope this will be the last one we have," he said. "We've been taking this real seriously and it looked like (layoffs) were the only way." He added that with the new OPF ready to open September 1, about 100 jobs would be eliminated there. "We decided to just do it all at once," he said. [Brown, FLORIDA TODAY, p. 12C, Aug. 24, 1991.]

HUMAN RESOURCES & EDUCATION ADMINISTRATOR NAMED

Lieutenant General **Spence (Sam) M. Armstrong** (USAF, Ret.) was named today to the new position of Associate Administrator for Human Resources and Education by NASA Administrator **Richard H. Truly**. Armstrong (Columbia, TN) is a 1956 graduate of the U. S. Naval Academy with a B.S. in engineering; he has an M.S. in astronautical engineering and M.S. in instrumentation engineering from the University of Michigan and has attended Columbia University's Executive Program in Business Administration and the Senior Managers in Government program at Harvard University. Armstrong retired from the Air Force in 1990 after a 34- year career including positions as Vice Commander of the U.S. Air Force Systems Command, Chief, U.S. Military Training Mission to Saudi Arabia, the U.S. Central Command. On retirement, he served as Director, Program Architecture for the Synthesis Group, in support of President Bush's Space Exploration Initiative. Truly said, "This new Associate Administrator will be responsible for developing NASA's human resources strategic plan and for furthering NASA's emphasis on national education goals. I feel very fortunate to have the opportunity to appoint an individual with the extensive qualifications of General Armstrong to this very important position. [NASA/KSC Release No. 91-138, Aug. 23, 1991.]

EXPLORATION ADMINISTRATOR NAMED

Dr. **Michael D. Griffin** was named Associate Administrator for Exploration today by NASA Administrator **Richard H. Truly**. Griffin, in his new position, is expected to provide direction, integration and oversight of activities involving NASA's exploration goals, including program, technical and fiscal management for matters relating to the Office of Exploration. Griffin is currently Deputy for Technology, Strategic Defense Initiative Organization (SDIO), U.S. Department of Defense, responsible for all technical research within the program. He has been awarded the Defense Department's Distinguished Public Service Medal for his key role in defining and technically directing the SDIO "Delta series" of space missions. He has also worked at JPL and Goddard Space Flight Center. Griffin received his B.A. in physics from Johns Hopkins University and master's degrees in Aerospace science from Catholic University, in electrical engineering from the University of Southern California, in applied physics from Johns Hopkins University and in Business Administration from Loyola College of Maryland. He has a Ph. D. in aerospace engineering from the University of Maryland and is a registered engineer in both Maryland and California.In his announcement of Griffin's selection, Administrator Truly said, "NASA is very fortunate to have Mike Griffin on the NASA team. He brings a wealth of knowledge, experience and dedication that will be instrumental in leading NASA's efforts to expand exploration beyond Earth orbit into the solar system." [NASA/KSC Release No. 91-139, Aug. 23, 1991.]

August 24: NEW LOCKHEED BOSS

Gerald Oppliger has been named President of Lockheed Space Operations Co. (Titusville, FL) and Program Manager of the Shuttle Processing Contract. "Lockheed is a big corporation, and to think that you were given the job out of all those thousands of people that are out there, it's a big honor," Oppliger said. [Banke, FLORIDA TODAY, pp. 10E & 9E, Aug. 25, 1991.]

August 26: DISCOVERY LAUNCH PREPARATIONS

Troubleshooting of software used to check ordnance firing circuitry for Discovery's STS 48 solid rocket boosters has been completed at Launch Complex 39A. Late on the night of August 23, testing failed for the right booster's forward frustrum parachute deploy firing circuit. A change has been made to the software and the test has been rescheduled this week; the launch schedule is not expected to be impacted. Ordnance installation and tests of the firing circuits had been planned for late August 23 and early August 24. The STS 48 Launch Readiness Review begins this afternoon. End-to-end tests of the Upper Atmosphere Research Satellite (UARS) are underway at the pad. In addition, technicians are circulating hydraulic fluid in the Orbiter and testing Discovery's communications system. Scheduled work includes a UARS launch readiness test for August 27; a flight readiness test to cycle the Shuttle's main engine valves and calibrate engine sensors will also take place August 27. Ordnance devices will be installed late on August 28 and aft closeouts will be started as well. The STS 48 Flight Readiness Review begins August 28 and runs through August 29. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 26, 1991.]

[] ATLANTIS: POST-FLIGHT WORK

Technicians in OPF Bay 2 have drained residual fluid from Atlantis' APU catch bottles and are preparing to remove the right hand radiators for inspections. Other work in progress includes: leak checks of the two newly installed fuel cells; rigging and cycling of the main landing gear doors; removal of auxiliary power unit (APU) no. 1; post-flight inspections of the vehicle; main propulsion system tests; preparations to remove the three Shuttle main engines, scheduled for tomorrow; and post-flight inspections of the thermal protection system. Also scheduled are leak and functional tests of the auxiliary power units. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 26, 1991.]

[] STS 49/ENDEAVOUR STATUS

The fuel cell simulators have been removed from Endeavour as processing for the newest Shuttle's STS 49 mission continues. The Orbiter's radiators will undergo a functional test this week. In progress are: inspections of the radiators; removal and replacement of several flexible metal potable water lines; preparing the freon coolant loop for servicing; validations of the electrical system; tests of the main propulsion system gaseous oxygen system; verification of the instrumentation

system and repair of the two orbital maneuvering system pods at the Hypergolic Maintenance Facility. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 26, 1991.]

LAUNCH READINESS REVIEW STATEMENT

Kennedy Space Center managers decided that Discovery's STS 48 mission will commence on or about September 12. That decision was made during today's Launch Readiness Review. "The Launch Readiness Review was a smooth one, and there were no significant concerns expressed by either the Discovery or UARS management teams. I hope the Flight Readiness Review will also go as uneventfully, since work at the launch pad [Launch Complex 39A] is essentially going as planned," said **Robert B. Sieck**, Shuttle Launch Director today at the conclusion of the LRR at Kennedy Space Center. A firm date will be set following the Flight Readiness Review scheduled for August 28-29. Meanwhile, prelaunch activities continue at LC 39A where payload technicians will test the 15,000-pound environmental research satellite (UARS) inside the Orbiter's payload bay. "It's a fairly major test for the payload guys. It will be their last major test before launch," said KSC spokesman **George Diller**. A test of the Shuttle main engines will also be conducted; the test will involve cycling engine valves and calibrating main engine sensors. ["Statement Following Launch Readiness Review," Aug. 26, 1991, Halvorson, FLORIDA TODAY, p. 4A, Aug. 27, 1991.]

LIGHTNING PROJECT INJURY

A approximately 1:15 p.m. today, a Mighty Mouse rocket being used in the Rocket Triggered Lightning Program at KSC inadvertently launched, slightly injuring a French electrical engineer from one of the French research teams here for the summer program. Kennedy Space Center spokesman **Karl Kristofferson** said, "He had just finished wiring the rocket and then he took two or three steps away from it, and the rocket just went up." Mr. **Louis Barret** was taken to the Complex 39 Dispensary and then to Parrish Medical Center (Titusville, FL) where his injuries are reported to be minor burns to his left leg. He was treated and released. The accident occurred shortly after final adjustments to the rocket had been made for launch. The rocket was not armed and standard safety procedures were being observed. The rocket landed in the normal impact zone on the east side of Mosquito Lagoon. There were no injuries at the impact site. Two rockets remaining in the launcher and a third in a nearby servicing area are being returned to an ordnance storage facility. A mishap investigation team has been established and is currently gathering data. At this time, the cause of the misfire is unknown. Launches at the Rocket Triggered Lightning Site have been suspended pending the findings of the team, expected to take less than a week. The Rocket Triggered Lightning Program is an annual research project involving several federal agencies, universities and international lightning research teams. The Mighty Mouse Rocket, used in the program, is 2.75 inches in diameter and 4 feet, eight inches long and carries a payload consisting of an airborne field mill (an electric field sensor) and a pressure transducer which is a barometric device. [Rocket Triggered Lightning Program Incident, Aug. 26, 1991, Halvorson, FLORIDA TODAY, p. 5A, Aug. 28, 1991.]

August 27: DISCOVERY PRE-LAUNCH STATUS

End-to-end tests of the Upper Research Satellite have been completed; UARS is the primary cargo of Discovery's STS 48 mission. The Orbiter's communications systems have also been tested. A Flight Readiness Test of Discovery's main engines has been conducted; engine valves will be cycled and the sensors will be calibrated. Discovery's flight control system is being tested and the vehicle's aerosurfaces will be positioned for launch. The UARS will be tested for launch readiness. Ordnance will be installed August 28 and the aft closeouts will also begin. On August 30, the astronauts' contingency space suits will be installed and tested in the Orbiter's airlock. The STS 48 Flight Readiness Review begins tomorrow. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 27, 1991.]

[] STS 44 PROCESSING

Atlantis' freon system has been deserviced and leak and functional tests of the auxiliary power units have been scheduled. Work in progress includes: removal of the main engines; functional testing of the forward reaction control system; preparations to remove the right hand radiators for inspections; inspections of the chin panel; leak checks of the two newly installed fuel cells; rigging and cycling of the main landing gear doors; post-flight inspections of the vehicle and post-flight inspections of the thermal protection system. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 27, 1991.]

[] APPLIED RESEARCH CONTRACT

Applied Research and Systems Division of Ensco, Inc. (Springfield, VA) has been selected for negotiation of a NASA contract to support weather tracking activities for the Space Shuttle Program at Kennedy Space Center. The new Applied Meteorological Unit (AMU) support contract will be worth $1.4 million; it will begin September 1991 and, with options, could extend through August 1996. The contract calls for supporting and conducting Shuttle weather application studies; supporting the Meteorological Interactive Data Display System (MIDDS) automated network used to track weather; and for the company to analyze, develop and/or evaluate and apply transitioning technology to operational products and systems. Procurement Director **Wes Dean** said the effort will further enhance Shuttle meteorological capabilities. Other bidders for the contract were Aeromet Inc. (Tulsa, OK) and Nyma Inc. (Greenbelt, MD). [KSC Release No. 104-91, Aug. 27, 1991.]

[] FLIGHT READINESS REVIEW BEGINS

The STS 48 Flight Readiness Review begins tomorrow at Kennedy Space Center and concludes August 29. "We look pretty good for the 12th. There are no major issues or concerns right now," said KSC spokeswoman **Lisa Malone.** A faulty valve has been replaced and will be tested August 29. A readiness test on the UARS payload went off without a problem, said Malone. [Halvorson, FLORIDA TODAY, p. 5A, Aug. 28, 1991.]

August 28: **STS 48 PREPARATIONS**

The flight readiness test of Discovery's main engines has been completed; during the test, the main oxidizer valve and its actuator for engine 2 failed. The valve was removed overnight; the replacement was not expected to have an adverse impact on the launch of STS 48 on September 12. Tests were also completed of the Orbiter's flight control system and the flight readiness of UARS; aerosurfaces were positioned for launch. Work in progress included: replacement of the main oxidizer valve and its actuator on main engine no.2; the Flight Readiness Review began at 8 a.m. and the official launch date and time will be announced at the conclusion of the review. Preparations are underway to install ordnance devices in the Orbiter, external tank and in the tail service masts on the mobile launcher platform; the pad will be closed and the job will be performed overnight. Technicians are charging the batteries on the Upper Atmosphere Research Satellite. A retest of the main oxidizer valve is scheduled for tomorrow; aft closeouts will begin shortly; installation and testing of the contingency space suits in the Orbiter's airlock will occur August 30. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 28, 1991.]

STS 44 PROCESSING

The number 2 main engine of Atlantis has been removed as have the right hand radiators for structural inspections. Workers have begun the following tasks: removal of the main engines; functional testing of the forward reaction control system; inspections of the chin panel; tests of the fuel cells; rigging and cycling of the main landing gear doors; post-flight inspection of the vehicle and its thermal protection system; leak and functional tests of the auxiliary power units. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 28, 1991.]

STS 48 LAUNCH ADVISORY

NASA managers have targeted September 12, 1991, for the launch of Discovery's STS 48 mission and its primary payload, the Upper Atmosphere Research Satellite (UARS). The announcement came at the conclusion of today's Flight Readiness Review at Kennedy Space Center. "We're not working any major problems at the pad and everything looks good. Managers are confident that September 12 is a very achievable launch date," said KSC spokesman **Bruce Buckingham**. The launch window on the 12th opens at 6:57 p.m. EDT and can be extended for approximately 2 1/2 hours. If the launch is postponed the window will open approximately 20 minutes earlier each day. A nighttime landing at KSC is expected at the conclusion of the five-day mission. [STS-48/UARS LAUNCH ADVISORY, 5:30 p.m., Aug. 28, 1991, Banke, FLORIDA TODAY, p. 1A, Aug. 29, 1991.]

August 29: **VALVE TEST RESULTS ANALYZED**

Data from tests on a new liquid oxygen valve on Discovery's main engine no. 2 will be analyzed by engineers at Kennedy Space Center today. The valve allows

liquid oxygen to flow through the engine; it was replaced last week after shown to be faulty by earlier testing. Installation of two space suits - to be used in an emergency by Mission Specialists **Charles "Sam" Gemar** and **James Buchli** in Discovery's airlock will be completed today. KSC spokesman **Bruce Buckingham** said that mission managers were unconcerned about a five-inch crack in an engine compartment steel beam; a repair is planned. [Banke, FLORIDA TODAY, p. 16A, Aug. 30, 1991, KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 29, 1991.]

STS 48 LAUNCH PREPARATIONS

Ordnance has been installed in Discovery, its external tank and in the tail service masts on the mobile launcher platform. The batteries have been charged on the Upper Atmosphere Research Satellite - main payload for STS 48. Aft compartment closeouts are underway. Work at Launch Complex 39A will be suspended for the Labor Day holiday weekend; afterward a number of activities are planned: continuation of the aft closeouts; purges of the external tank; pressurization of the hypergolic propellant storage tanks; final ordnance activities and payload closeouts. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 29, 1991.]

STS 44 PROCESSING

All three main engines have been removed from Atlantis; the engines are now in the VAB engine hop for post-flight inspections, tests and any needed repairs. The 17-inch disconnect pre-valves have been inspected and a new seal has been installed in the 4-inch hydrogen recirculation line located in the 17-inch disconnect umbilical. Work in progress includes: functional testing of the forward reaction control system; inspections of the chin panel; tests of the fuel cells; rigging and cycling of the main landing gear doors; post-flight inspections of the vehicle; post-flight inspections of the thermal protection system and leak and functional tests of the auxiliary power units. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 29, 1991.]

ENDEAVOUR PROCESSING

Processing work continues on the newest Space Shuttle Endeavour (OV 105) in OPF Bay 1; these activities include: replacement of a floor beam cap in the Orbiter's aft compartment. A five-inch crack was found in this floor cap which provides structural strength for a beam in the small compartment. Additionally, a few of the flexible metal potable water lines were replaced in the vehicle's middeck; the fuel cell simulators were removed. Other tasks include: installation and rigging of the right hand external tank umbilical door; validations of the electrical system; verification of the instrumentation system; installation of thermal control blankets in the midbody; repair of the two orbital maneuvering system pods at the Hypergolic Maintenance Facility; tile operations around the nose landing gear doors. [KSC SHUTTLE STATUS REPORT, 10 a.m., Aug. 29, 1991.]

August 30: FEES FOR PLAYALINDA?

Entrance fees for access to Playalinda Beach may be in the offing if Canaveral National Seashore Superintendent **Wendell Simpson** has his way. Simpson contends that without more money, the park service will be hard pressed to protect the beaches, ancient Indian sites and beach visitors and their property. The park service has nine rangers. He said, "Without fees, it will be hard to maintain the level of service we currently have, which is not adequate." He is proposing that residents of Brevard, Orange and Volusia Counties pay a $10 annual fee and that others would pay $3 per car per visit. [Fiorini, FLORIDA TODAY, pp. 1A-2A, Aug. 31, 1991.]

[] STS 48 PRE-LAUNCH PREPARATIONS

The replaced actuator valve on engine no. 2 failed three of five retests; the valve exceeded specifications margins in each case and a decision was made to replace this unit. Work in progress includes: removal and replacement of the main oxidizer valve on engine no. 2; battery conditioning of the Upper Atmosphere Research Satellite; loading of computer mass memory units; closeouts of the aft compartment. Scheduled work includes: retests of the newly installed actuator valve on engine no. 2 and final tile inspections. Launch remains planned for September 12, 1991. [KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 30, 1991.]

[] ATLANTIS PROCESSING

Leak and functional tests of Atlantis' auxiliary power units have been completed in preparation for the Orbiter's next mission, STS 44. Checkouts of flutter buffers (accelerometers) and the vehicle's forward reaction control system functional test have been completed also. Post-flight (STS 43) inspections of the vehicle and its thermal protection system are underway as are checkouts of the chin panel. [KSC SHUTTLE STATUS REPORT, 11 a.m., Aug. 30, 1991.]

[] TREKKERS BEAMED TO KSC

"This is like stepping back in time and seeing where we came from," commented **Nichelle Nichols** during the visit she made with fellow Star Trek cast members **George Takei** and **James Doohan** to Kennedy Space Center. The three were in Central Florida for a convention marking the 25th anniversary of the beginning of the Star Trek television series. Nichols, who played communications officer Lt. Uhuru has worked for NASA in minority recruitment, and Doohan. who played chief engineer Scott, have visited KSC often, but this was a first for George Takei who played Sulu on the series. "It was frightening to be in the control center," Takei said. "With all those buttons and blinkers, and to know that if I touched something, something would happen." He said the opposite was true on the bridge of the USS Enterprise. The cast members also met astronauts **Curt Brown**, **Rick Searfoss** and **Dave Wolf**. [Banke, FLORIDA TODAY, p. 1A, Aug. 31, 1991.]

SECOND VALVE REPLACEMENT ON DISCOVERY

Discovery's liquid oxygen valve replacement on engine no. 2 was replaced itself when it failed a test August 27, according to KSC spokesman **Mitch Varnes.** "Once that valve passes its test, those workers should be able to take the rest of the weekend of," Varnes said. "We see no problem in catching up, and we're still looking good for a September 12 launch," he said. [Banke, FLORIDA TODAY, p. 4A, Aug. 31, 1991.]

SEPTEMBER

September 1: HOLIDAY FOR KSC WORKERS

No work is scheduled upon any of the three resident Space Shuttles at KSC today; all three are powered down for the Labor Day holiday. The only workers on duty today are safety and security personnel. The first order of business for pad workers tomorrow, however, is the replacement, again, of the liquid oxygen valve on Discovery's no. 2 main engine. The first replacement valve failed tests for leaks. The second replacement will be tested September 2, according to KSC spokesman **Mitch Vames**. [Banke, FLORIDA TODAY, p. 1A, Sept. 2, 1991.]

September 3: NEW OPF OPENED

"We believe the work force is going to consider it Cadillac of OPFs," said **Walter Murphy**, Kennedy Space Center's Director of Engineering Development today as the space center's new $170 million OPF was officially opened. Lockheed's **Ken Geiler** described the new facility as being identical in size to KSC's other two processing facilities, but the new high bay utilizes modernized systems, more efficient work platforms and a brighter work environment. Center Director **Forrest S. McCartney** said, "What we have here today is an example of ingenuity, and looking to see how you can really recycle things, if you will, to the ultimate. This is the most modern processing facility we have, and one that should serve this nation well in the years ahead." Discovery, on its return from the STS 48 mission, will be the first Orbiter to use the new facility. The new OPF was formerly named the Orbiter Maintenance and Refurbishment Facility and is located just north of the Vehicle Assembly Building in the Launch Complex 39 area. The basic structure, completed in 1987, has been used primarily for offline Orbiter inspection, modification and repair work. In 1988, upgrade to full OPF flight processing status was targeted for early September 1991. "We had a good team that worked together smoothly and made it happen," said Design Engineering's **Jim Bean**, Bay 3 Project Manager. Bean said, "About $114 million in portable ground support equipment (GSE) already on hand is shared between all three OPF bays, leaving us about $16 billion worth of GSE we had to purchase outright. The rest came when Shuttle activities were curtailed unexpectedly at Vandenberg Air Force Base in California. We ended up with $40 million worth of GSE equipment that would have cost considerably more if purchased today." Other Shuttle-unique equipment was also shipped from California to Kennedy Space Center. [Banke, FLORIDA TODAY, p. 1A, Sept. 4, 1991, NASA/KSC News Release No. 105-91, Aug. 30, 1991.]

STS 48 PRELAUNCH STATUS

Replacement of the second main oxidizer valve on the no. 2 main engine of Discovery has been completed; the flight readiness test of the no. 2 main engine was successful. The two contingency space suits have been installed and tested. Work in progress includes: the helium signature leak test of the no. 2 main engine; launch countdown preparations; closeouts of the aft compartment;

preparations of the payload for flight; stowing equipment in the crew cabin; cleaning and inspecting the radiators and final thermal protection system inspections. Scheduled work includes: purges of the external tank; pressurization of the hypergolic propellant storage tanks; purging of the power reactant storage and distribution system tanks. The STS 48 crew is expected to arrive at Kennedy Space Center at 7:30 p.m. on September 9. [KSC SHUTTLE STATUS REPORT, 10 a.m., Sept. 3, 1991.]

[] **STS 44: ATLANTIS PREPARATIONS**

Functional tests of Atlantis' forward reaction control system have been completed. Preparations have begun to: replace a thruster on the left orbital maneuvering system pod; replace of the auxiliary power unit water valve; rigging of the main landing gear doors; inspect payload bay door nut plates; functional testing of the payload bay doors; inspect the main propulsion system lines; service the ammonia boiler. Scheduled work includes tests of the power reactant storage and distribution system and installation of the three main engines. [KSC SHUTTLE STATUS REPORT, 10 a.m., Sept. 3, 1991.]

September 4: **DISCOVERY'S ORDNANCE LOADED**

Launch Complex 39A will be closed today to all but essential personnel for the installation of explosive devices aboard Discovery; the vehicle's onboard fuel tanks will also be pressurized. Operations began at 4 a.m., according to KSC spokesman **Bruce Buckingham**. The helium signature leak test of the three main engines has been completed. Leak checks of the main engine seals have also been completed. Work in progress includes purges of the external tank as a conditioner prior to loading of propellants during the countdown. The power reactant storage and distribution system tanks will be purged September 6. The three-day launch countdown begins at 5 p.m. September 9. The crew arrives at Kennedy Space Center about 9:30 on the 9th. The five-member crew includes Commander **John Creighton**, Pilot **Kenneth Reightler** and Mission Specialists **Mark Brown, Charles "Sam" Gemar** and **James Buchli**. The launch window for the September 12 launch extends from 6:57 p.m. until 9:54 p.m. [Banke, FLORIDA TODAY, p. 5A, Sept. 5, 1991, KSC SHUTTLE STATUS REPORT, 10 a.m., Sept. 4, 1991.]

[] **OPF BAY 2: ATLANTIS PROCESSING**

In Orbiter Processing Facility Bay 2, the Space Shuttle Atlantis had a thruster replaced on the left orbital maneuvering system pod and the Orbiter's payload bay doors were opened. Functional tests of the vehicle's power reactant storage and distribution system have begun; other tasks have begun as well: replacement of the auxiliary power unit water valve; rigging the main landing gear doors; inspections of the main propulsion system lines; repair of a crack in the chin panel at the vendor; electrical checks of the main propulsion system. Atlantis' three main engines will be installed next week. [KSC SHUTTLE STATUS REPORT, 10 a.m., Sept. 4, 1991.]

OPF BAY 1: ENDEAVOUR PROCESSING

The Space Shuttle Endeavour remains in Orbiter Processing Facility Bay 1 where the pressure test of its no. 1 freon coolant loop has been completed; the controller for auxiliary power unit no. 2 has also been installed. A functional test of the Orbiter's radiators has been scheduled for this week. Work in progress on Endeavour includes: preparations to install the right hand external tank door; replacement of an intercostal beam cap in the aft compartment; installation of the new general purpose computers; replacement of potable water lines in the middeck; rigging the radiators, preparing the freon coolant loop for servicing; test and repair of the two orbital maneuvering system pods at the Hypergolic Maintenance Facility. [KSC SHUTTLE STATUS REPORT, 10 a.m., Sept. 4, 1991.]

September 5: DISCOVERY STATUS

The final installation and connection of ordnance devices have been completed on the Space Shuttle Discovery; purges of the Orbiter's external tank have also been completed. Work in progress on Discovery includes: pressurization of the hypergolic propellant system storage tanks for flight; tests of ordnance firing circuits; launch countdown preparations; closeouts of the avionics bays in the aft compartment; preparing the payload for flight; stowing equipment in the crew cabin. Work scheduled includes the purging of the power reactant storage and distribution system tanks. [KSC SHUTTLE STATUS REPORT, 10 a.m., Sept. 5, 1991, Banke, FLORIDA TODAY, p. 2A, Sept. 6, 1991.]

September 6: DISCOVERY LEAK IMPACT

"Our operations people are optimistic. They've seen this situation before and have been able to fix it. But they're not going to uncross their fingers yet," said Kennedy Space Center spokesman **Bruce Buckingham** about a leak found in Discovery's in-orbit steering system. "We need it to keep the system safe. We've flown with that type of configuration before." The valve is in a helium line which clears propellants in the steering thrusters. Buckingham conceded the possibility that in a worst-case scenario the liftoff might be delayed for several weeks while Discovery is rolled back to the VAB for repairs. [Brown, FLORIDA TODAY, p. 1A, Sept. 7, 1991.]

DISCOVERY: PRE-LAUNCH OPERATIONS

Ordnance devices have been installed on Discovery and tested in preparation for its September 12 STS 48 launch. The hypergolic propellant system storage tanks have been pressurized for flight and the solid rocket booster forward skirts have been closed out. Among those tasks still in progress are: purges of the power reactant storage and distribution system tanks; checks of a helium regulator on the right reaction control system; flushing and sampling of the crew's potable water supply and closeouts of the aft compartment. Technicians working on Discovery at Launch Complex 39A are circulating helium through the Cryogenic Limb Array Etalon Spectrometer (CLAES) on the Upper Atmosphere Research

Satellite. This process, which began last night, will cool the instrument down for launch. Helium circulation will continue through September 8; closeouts of the aft compartment are also scheduled for the 8th. The countdown is scheduled to begin at 5 p.m. EDT, September 9 and the flight crew arrives the same evening at 9:30. Launch remains scheduled for 6:57 p.m. EDT on September 12. [KSC SHUTTLE STATUS REPORT, 11:30 a.m., Sept. 6, 1991.]

[] ATLANTIS PROCESSING

Atlantis' Processing work in behalf of STS 44 continues with the installation of the vehicle's radiators, main landing gear brakes, wheel and tire assemblies. Technicians are replacing the water valves for the auxiliary power units, servicing the ammonia boiler and are undertaking functional tests of the power reactant storage and distribution system. They are also installing thermal blankets in the Orbiter and will be installing the three main engines next week. [KSC SHUTTLE STATUS REPORT, 11:30 a.m., Sept. 6, 1991.]

[] ENDEAVOUR PROCESSING

Work continues in the processing of OV 105 (Endeavour). Tasks include: preparations to install the right hand external tank door; replacement of an intercostal beam cap in the aft compartment; installation of the new general purpose computers; replacement of potable water lines in the Orbiter middeck; rigging the radiators; drying the freon coolant loop in preparation for servicing; test and repair of the two orbital maneuvering system pods at the Hypergolic Maintenance Facility. A functional test of the Orbiter's radiators is scheduled for this week. [KSC SHUTTLE STATUS REPORT, 11:30 a.m., Sept. 6, 1991.]

September 7: LAUNCH PLANS PROCEED DESPITE LEAK

"Right now we think it'll be OK for flight, but they still want to gather some more data," said Kennedy Space Center spokeswoman **Lisa Malone** concerning the impact of a leak discovered in the orbital steering system. Plans to launch the Shuttle continue while technicians study the leak. "The leak has not gotten any worse, and the engineers think they understand how it's behaving, so they can manage it," Malone said. A landing at Kennedy Space Center is planned for September 18 at 1:55 a.m. [Brown, FLORIDA TODAY, p. 1A, Sept. 8, 1991, Date, THE ORLANDO SENTINEL, Sept. 8, 1991, "NASA Prepares for Launch, Looks for Bugs," THE ORLANDO SENTINEL, Sept. 8, 1991.]

September 9: DISCOVERY COUNTDOWN TO START

Countdown for the STS 48 mission begins today at 5 p.m. Kennedy Space Center spokeswoman **Lisa Malone** said, "Everything's going smoothly." Engineers will recheck a helium line which is part of Discovery's onboard steering system; if a leak reappears, the problem is not expected to affect the launch because an alternate line can be used, said Malone. The five-member crew of Commander **John Creighton**, Pilot **Ken Reightler** and Mission Specialists **James Buchli, Charles**

"Sam" Gemar and **Mark Brown** is expected to arrive tonight at 9:30 p.m. The payload bay doors will be shut tomorrow morning. [Brown, FLORIDA TODAY, p. 1A, Sept. 9, 1991.]

DISCOVERY PASSES LEAK TEST

The countdown to the launch of Discovery's STS 48 mission will continue uninterrupted; the Orbiter passed a crucial steering system leak test today. Tests over the weekend showed that the leak was so small as to present no significant problem, according to NASA Test Director **Mike Leinbach**. "Once the leak rate was quantified, everyone was happy," said Leinbach, noting that Columbia had flown in 1990 with a similar leak. When Discovery's crew arrived at Kennedy Space Center at 9:30 p.m., Commander **John Creighton** said, "It's been a long training period, and we feel ready to go. Now it's time to go do it for real." If the launch goes on time at 6:57 p.m. September 12, the landing at KSC is expected to occur at 1:55 a.m. on September 18. [Halvorson and Banke, FLORIDA TODAY, p. 1A, Sept. 10, 1991.]

September 10: LAUNCH MINUS 2 DAYS

The overall probability of having acceptable weather conditions at T minus zero is 70 percent. For the duration of the window - 6:57 p.m. until 9:54 p.m. EDT - the chance of having acceptable weather is 80 percent. Loading of liquid oxygen and liquid hydrogen reactants into the Orbiter's onboard fuel cell storage tanks begins this afternoon and will complete this evening. The rotating service structure will be moved to the launch position at 5 p.m. September 11. Loading propellants into the external tank begins at 10:37 a.m. September 12. "Our status looks pretty good and we're looking forward to a good launch," said **Roelof Schuiling**, the Kennedy Space Center manager in charge of preparing the Upper Atmosphere Research Satellite for launch. Discovery's payload bay doors were closed for flight at 4:26 a.m. today. Tests and calibrations of leak detectors in the hazardous gas detection system in the mobile launcher platform were completed. Routine pre-countdown inspections of the Orbiter performed by safety and engineering personnel. The right hand reaction control system was pressurized for flight. The known helium leak in this system has been determined to be acceptable for flight; the leak is being managed with the reaction control system helium isolation valves. Today, STS 48 Commander **John Creighton** and Pilot **Mike Baker**, who is not a member of the STS 48 crew, are practicing approaches to the Shuttle Landing Facility in the Shuttle Training Aircraft. Forecasters predict a 70 to 80 percent chance the weather will be acceptable for launch with the possibility of thunderstorms the only concern. [KSC SHUTTLE STATUS REPORT, 10 a.m., Sept. 10, 1991, Banke, FLORIDA TODAY, p. 2A, Sept. 11, 1991.]

STS 44 PROCESSING: ATLANTIS

Work in progress on Atlantis for its STS 44 mission includes: connection of the Shuttle's no. 1 and 2 main engines; fill and bleed of the brakes; installation of the brakes; tests of the power reactant storage and distribution system; repair of a

crack in the chin panel at the vendor; installation of thermal blankets in the Orbiter. Scheduled work includes: installation of main engine no. 3 later this week and replacement of a leaking check valve in the main propulsion system. [KSC SHUTTLE STATUS REPORT, 10 a.m., Sept. 10, 1991.]

[] PUBLIC INVITED TO LAUNCH

Visitors at Kennedy Space Center's Spaceport USA on September 12 will be able to stay for the launch at 6:57 p.m. and for $6.00 will be transported to the NASA Causeway Shuttle Viewing Site on the Banana River. The catch is, those persons wishing to stay for the launch must be at Spaceport USA by noon when KSC security will close the main gates to the space center. "At that time, anyone on the property at Spaceport USA will be allowed to stay," according to Spaceport spokesman **Tom Blair**. [Banke, FLORIDA TODAY, p. 1A, Sept. 11, 1991.]

September 12: DISCOVERY ROARS OFF PAD

"It was definitely the loudest one I've ever heard. And it was bright; it hurt my eyes," said Kennedy Space Center spokesman **Bruce Buckingham** about the launch at 7:11 p.m. today of STS 48. Discovery reached an orbital height of 336 miles above the earth about nine minutes after launch. The launch was delayed for 14 minutes to check a vital radio link between Discovery and Johnson Space Center's Mission Control. Launch Director **Robert B. Sieck** commenting on the liftoff said, "We enjoyed a smooth launch count, but then we had the proverbial glitch in a ground-system circuit." The mission, NASA's 43 Shuttle flight, is commanded by **John Creighton** and piloted by space rookie **Ken Reightler**. The Mission Specialists aboard include: **James Buchli, Charles "Sam" Gemar** and **Mark Brown**. [Brown, FLORIDA TODAY, p. 1A, Sept. 13, 1991, Date, THE ORLANDO SENTINEL, pp. A-1 +, Sept. 13, 1991, KSC SHUTTLE STATUS REPORT, 10 A.M., Sept. 13, 1991.]

[] REPAIRS MAY DELAY ATLANTIS LAUNCH

Repairs to a heat-absorbing panel on the Space Shuttle Atlantis might delay its STS 44 mission until after Thanksgiving. Launch Director **Robert B. Sieck** said today that it would be difficult for Atlantis to be ready in time for its projected November 19 liftoff. "Our goal is to launch before Thanksgiving, but we'll see," he said. "We haven't given up on launching before December." The panel in question was shipped to its manufacturer and is expected to be returned to KSC this weekend. [Halvorson, FLORIDA TODAY, p. 4A, Sept. 13, 1991, KSC SHUTTLE STATUS REPORT, 10 A.M., Sept. 13, 1991.]

September 13: AMF SUED BY BUILDER

Industrial Steel Inc. (Mims, FL) which helped construct the Astronauts Memorial at Spaceport USA is suing two contractors, a bonding agency and the Astronaut Memorial Foundation. The company is seeking money it claims it is owed. **David Walsh**, speaking in behalf of the AMF said, "We shouldn't even be a part of this

suit. It's between the general contractor [VSL Corporation (CA)] and subcontractors, in a domino fashion." [Brown, FLORIDA TODAY, p. 3B, Sept. 14, 1991.]

ATLANTIS PROCESSING: OPF BAY 2

The third Shuttle main engine has been installed on Atlantis; the waste containment system, main wheels and tire assembly have also been installed. The mating of the left aft center solid rocket booster segment is also complete. Work in progress includes: orbital maneuvering system and reaction control system functional tests; auxiliary power unit water valve installation; Shuttle main engine electrical mates. Further work has been scheduled for Atlantis' STS 44 processing: the chin panel is due to arrive at KSC tomorrow with fit checks of the panel this weekend; service freon coolant loop; engine heat shield installation; left forward center solid rocket booster segment mates. [KSC SHUTTLE STATUS REPORT, 10 A.M., Sept. 13, 1991.]

ENDEAVOUR PROCESSING: STS 49

Endeavour's external tank leak checks have been completed in Orbiter Processing Facility High Bay 1. Technicians are currently running Shuttle main engine checks and main propulsion system checks. They are installing thermal protection system blankets and performing power reactant and storage distribution tank checks. The external tank is scheduled to be pressurized. [KSC SHUTTLE STATUS REPORT, 10 A.M., Sept. 13, 1991.]

TITUSVILLE TO LIGHT LANDING

The mayor of Titusville, FL, has asked the residents of his city to leave its porch lights on September 18 as an aid to the night landing of the Space Shuttle Discovery. The first-ever night landing is to occur at Kennedy Space Center at 2:09 a.m. The porch light idea came from **Bobbie Carlson**, wife of **Norm Carlson**, NASA Deputy Director of Launch operations. The mayor of Titusville is **Tom Mariani** who is employed at KSC in Payload Operations. ["Titusville Shines," FLORIDA TODAY, p. 1A, Sept. 14, 1991.]

PAD DAMAGE NORMAL, BOOSTERS RECOVERED

"We didn't find anything that doesn't usually come with a launch," said KSC spokesman **George Diller** concerning damage to Launch Complex 39A following Discovery's liftoff September 12. Damage included burned wiring, singed metal and a few broken light bulbs; this was considered minor. Discovery's two solid rocket boosters were recovered at sea by the ships Liberty Star and Freedom Star and are expected to be towed back to Port Canaveral for an 8:45 a.m. arrival tomorrow. Preliminary inspections of the boosters at sea revealed no problems, according to Diller. [Banke, FLORIDA TODAY, p. 2A, Sept. 14, 1991, KSC SHUTTLE STATUS REPORT, 10 A.M., Sept. 13, 1991.]

September 14: LC 34 CLEANED BY VOLUNTEERS

A group of volunteers numbering more than 400 cleared debris from a mile-long stretch of beach at Cape Canaveral Air Force Station while NASA Administrator **Richard Truly** and former Apollo astronaut **Tom Stafford** helped rededicate the Apollo 1 launch site at Launch Complex 34. LC 34 is the pad where AS 204 astronauts **Ed White, Roger Chaffee** and **Virgil "Gus" Grissom** died in a fire during a test there. On hand for the cleanup besides Truly and Stafford were U. S. Representative **Jim Bacchus**, Spaceport Florida Executive Director **Ed O'Connor** and Kennedy Space Center Director **Forrest S. McCartney**. The group planted three small oak trees near the site of the January 27, 1967, fire. Bacchus said, "I think it's been a moving experience for all of us who turned out today and a reminder of the fact that we need to rebuild the launch infrastructure to better compete with Japanese and European space agencies. The trees will serve as a living memorial [to White, Chaffee and Grissom]. [Rowe, FLORIDA TODAY, p. 1A, Sept. 15, 1991.]

[] RUNWAY PAVING FINISHED

Goodson Paving Inc. (Sharpes, FL) finished its runway paving job at Kennedy Space Center in 13 days, instead of the 72 days which had been allotted for the company to pave extra runway space on the Shuttle Landing Facility. **Kim Fortier**, the company's vice president, said, "The contract administrator asked 'could we push?' and we pushed." **T. K. Gwin**, Shuttle Landing Facility Operations Manager, said, "With the type of aircraft operations that we've had, it seemed feasible to work on both ends of the runway at the same time. Everybody was very willing to do everything it took to get it done." **Brewster Shaw**, NASA's Deputy Director for Shuttle Operations, said, that the lengthened overruns "are just there for insurance. Now we have better insurance." [Banke, (FLORIDA TODAY, p. 10E, Sept. 15, 1991.]

[] ITALIAN SPACECRAFT TECHNICIANS

This week a team of some 24 Italian engineers will arrive at Kennedy Space Center to help assemble a spacecraft which is a September 1992 Atlantis payload. The engineers are employees of the Italian satellite contractor Alenia; their satellite will be part of the Tethered Satellite System. The engineers will participate in the electronic integration of the satellite into a support assembly which will remain in the cargo bay during the seven-day mission. KSC spokesman **George Diller** said, "The whole thing has been very challenging electrically because there is so much wiring associated with the system." [Halvorson, FLORIDA TODAY, Sept. 15, 1991.]

September 16: DISCOVERY TO LAND AT KSC

The Space Shuttle Discovery is expected to conclude its STS 48 mission by coming from the north over Jacksonville, FL, shortly before 2 a.m. September 18; it will pass over St. Augustine, Daytona Beach and Titusville and land at KSC about 2:06 a.m. A second landing opportunity at the SLF is at 3:38 a.m. KSC

spokesman **Bruce Buckingham** said, "Brevardians won't see anything, but they will hear the sonic booms. If they're watching NASA Select television, they'll see the Orbiter coming in on infrared camera. It'll look like a negative image with hot spots from re-entry. The hot spots will show up in white." Buckingham also noted that "there's a slight chance of light, patchy ground fog, but that shouldn't present a problem." Shuttle Program Director **Robert L. Crippen** added, "We normally prefer to go when we can land in the daylight. But we have demonstrated several times that we can land very well at night."

Kennedy Space Center's Shuttle Landing Facility was constructed in 1975. It is 300 feet wide and 15,000 feet long with 1,000 foot overruns at each end. (See story above.) The strip runs northwest to southeast. It is located about 3 miles northwest of the Vehicle Assembly Building. Until Atlantis landed at KSC last month, the prime landing site had been Edwards Air Force Base, CA. Discovery's landing on the 18th will be the ninth at KSC in the 10-year history of the Space Shuttle Program. Previous landings at the space center are noted in the following chart:

SHUTTLE LANDINGS AT KSC

Mission	Orbiter	Landing Date
STS 41-B	Challenger	February 11, 1984
STS 41-G	Challenger	October 13, 1984
STS 51-A	Discovery	November 16, 1991
STS 51-C	Discovery	January 27, 1985
STS 51-D	Discovery	April 19, 1985
STS 38	Atlantis	November 20, 1990
STS 39	Discovery	May 6, 1991
STS 43	Atlantis	August 11, 1991

There are a number of general weather restrictions which apply for a landing at Kennedy Space Center to take place:

*Surface winds must be less than 20 knots in any direction, and less than 12 knots for crosswinds;

*The ceiling must be greater than 10,000 feet. For scattered clouds below 10,000 feet, cloud cover must be observed to be less than 20 percent at the deorbit burn go/no go decision time;

*Visibility must be seven miles or greater;

*There can be no precipitation at the surface or aloft in the proximity of the Orbiter;

*Thunderstorms, rain or the potential for lightning cannot be within 30 nautical miles of the landing site;

*Vertical cloud clearance at the 30 nautical mile range, must be greater than 2 nautical miles.

[Halvorson, FLORIDA TODAY, p. 1A, Sept. 17, 1991, Buckingham, NASA/KSC RELEASE NO. 113-91, Sept. 16, 1991, Date, THE ORLANDO SENTINEL, Sept. 18, 1991.]

September 17: **LANDING WEATHER FORECAST**

Kennedy Space Center spokesman **George Diller** provided a forecast of the expected weather for Discovery's landing tomorrow morning at 2:06 a.m. The temperature is expected to be 77 degrees; wind variable at 3 knots. Scattered clouds are expected at 2,500 feet with visibility for seven miles. There is a chance of patchy ground fog. [NOAA Space Flight Meteorology Group, JSC, 3 p.m., September 17, 1991.]

September 18: **DISCOVERY LANDS AT EDWARDS**

Cloudy skies and a threat of rain necessitated a searchlight-illuminated landing at Edwards Air Force Base, CA, for the Space Shuttle Discovery at the conclusion of its STS 48 mission early this morning; the landing was at 3:38 a.m. It was the fifth night landing in California. After the attempt to land at Kennedy Space Center was scrapped, Discovery made an extra orbit and crossed the Pacific Ocean and over land near Newport, OR. Six hours after the landing, the STS 48 crew flew to Houston, where a group of 50 people greeted them on arrival. Rookie Pilot **Ken Reightler** enthused about the mission saying, "That was a most excellent adventure." Mission Specialist **James Buchli** added, "We really had a ball." Shuttle Program Director **Robert L. Crippen** said, "The weather [in Florida] was just dynamic enough that we were not comfortable with it, and consequently we landed some place that we were comfortable with. All in all, it was a super flight. I'm proud of the way the team executed it." The Orbiter underwent preliminary inspections at Edwards at NASA Test Director **Eric Redding** said, "It looked very good." The Shuttle's tires, brakes and heat protection tiles held up well. Redding said that technicians in California will now concentrate on getting the Orbiter ready for its cross-country ferry ride to Florida. The next Space Shuttle mission will be STS 44 with Atlantis and is expected to come in late November. [Banke, FLORIDA TODAY, p. 1A, Sept. 19, 1991, "Shuttle Lands," USA TODAY, p. 3A, Sept. 19, 1991, "Weather Diverts Shuttle to Landing in California," THE NEW YORK TIMES, p. 12A, Sept. 19, 1991.]

September 19: **DISCOVERY: STATUS REPORT**

Discovery appears to be in good shape following the STS 48 flight. The Orbiter rolled out a distance of 8,790 feet from its touchdown point on concrete Runway 22 at Edwards Air Force Base. The total mission elapsed time for STS 48 was 5

days, 8 hours and 27 minutes. KSC's landing and recovery teams are in California preparing Discovery for the return trip to Florida. The cross-country ferry flight is scheduled to begin early September 24. Pending favorable weather conditions, a one-day ferry flight is possible. The Orbiter has been towed to the Mate Demate Device and ground cooling has been established to the vehicle. Post-flight work on the two boosters is continuing at Hangar AF at the Cape Canaveral Air Force Station. Hydrolasing activities have been completed to remove the exterior foam and cork. The safe and arm devices have been removed. Today, technicians are removing the nozzle on the right booster and removing the external tank attach ring on the left booster. The left nozzle has already been removed. Stiffener rings are being removed from the left booster. Disassembly of the boosters is scheduled to begin this weekend. [KSC SHUTTLE STATUS REPORT, Sept. 19, 1991, Date, THE ORLANDO SENTINEL, Sept. 19, 1991.]

ATLANTIS IN OPF BAY 2

Work in progress on Atlantis for its STS 44 mission in November includes: functional tests of the radiators, preparations to service the freon coolant loop system, removal of window no. 5 (pilot's window) because of a ding, tests of the external tank door latches, functional testing of the orbital maneuvering system (OMS) and reaction control system, thermal protection system operations around the external tank doors and nose landing gear doors, functional testing of the waste containment system and work to ready the chin panel for installation. Scheduled work includes: functional testing of the external tank doors and servicing of the Orbiter's cooling system with freon by the end of the week. [KSC SHUTTLE STATUS REPORT, Sept. 19, 1991.]

ENDEAVOUR STATUS REPORT

The newest Space Shuttle, Endeavour (OV 105) continues to undergo processing for its first mission STS 49 in OPF Bay 1. That work includes: preparations to install the remote manipulator system, installation of the fuel cells, leak and functional tests of the ammonia system, repair of the intercostal beam in the aft compartment, installation of thermal control blankets in the midbody, inspections of struts in the midbody and main propulsion system work. Scheduled work includes: a flush of the orbital maneuvering system crossfeed system, inspections of the radiators, servicing the Orbiter's cooling system with freon this week and installation of the robot arm (RMS). [KSC SHUTTLE STATUS REPORT, Sept. 19, 1991.]

CALIFORNIA BOUND

Technicians gathered today at Edwards Air Force Base to prepare Discovery for its ferry-flight back to Kennedy Space Center. The team included nearly 200 workers from KSC. Chris Fairey, NASA manager in charge of preparing Discovery for both launch and landing, said that initial inspections showed Discovery to be in excellent shape. More detailed inspection results will be released tomorrow, he

said. Hardware problems which required post-flight attention included a false alarm from a smoke detector, two faulty readings from instrumentation and a leaky water valve. Fairey said, "They will require a little bit of troubleshooting but all of those are really something we can handle without any problems." [Banke, FLORIDA TODAY, p. 2A, Sept. 20, 1991.]

September 20: **DISCOVERY: PREPARING TO FERRY**

Discovery, still at Edwards Air Force Base after its September 18 landing in California, has been transferred to ground power and the fuel cells are in the cool-down process. Residual propellants will be offloaded tomorrow. The external tank ferry flight doors are being rigged. Bearings in the main engine high pressure pumps have been dried. Post-flight inspections are continuing. Shuttle engineers report that Discovery's tiles sustained average damage during its STS 48 mission.

Post-flight work continues on the two solid rocket boosters now at Hangar AF at the Cape Canaveral Air Force Station. Technicians are scheduled to remove the right forward skirt today. Both nozzles have been removed; the external tank attach ring and stiffener rings on the left booster have been removed. Disassembly of the boosters is scheduled to begin this weekend. Mobile launcher platform no. 3 was brought back from Launch Complex 39A to the Vehicle Assembly Building yesterday; the platform will be prepared to stack boosters for the next Shuttle mission, STS 44 with Atlantis in November. [KSC SHUTTLE STATUS REPORT, Sept. 20, 1991.]

STS 44 PREPARATIONS

Technicians in Orbiter Processing Facility Bay 2 have completed tests of the external tank door latches for the STS 44 configuration; they have also finished the functional testing of the radiators, removed window no. 5 and completed functional tests of the waste containment system of Atlantis. Work in progress includes: removing the brake module; preparations to service the freon coolant loop system; functional tests of the orbital maneuvering system (OMS) and reaction control system; thermal protection system operations around the external tank doors and nose landing gear doors and the installation of instrumentation and wiring on the chin panel. Scheduled work includes a functional test of the external tank doors and servicing of the coolant system by the end of the week. [KSC SHUTTLE STATUS REPORT, Sept. 20, 1991.]

ENDEAVOUR PROCESSING/STS 49

Main propulsion system helium tank leak checks and installation of the left external tank door have been completed for the STS 49 mission of Endeavour. Technicians in OPF Bay 1 are rigging the left hand external tank door, preparing to install the remote manipulator system, installing the fuel cells, conducting leak and functional tests of the ammonia system, installing thermal control blankets in the Orbiter's midbody, inspecting midbody struts and continuing main propulsion

system work. Workers are scheduled to flush the orbital maneuvering system crossfeed system this weekend and will be inspecting the vehicle's radiators, servicing its cooling system with freon and installing the robot arm. [KSC SHUTTLE STATUS REPORT, Sept. 20, 1991.]

LOCKHEED LAYS OFF 300

Lockheed Space Operations, prime contractor for Space Shuttle processing today informed 300 of its Kennedy Space Center workers that they will be laid off in two weeks. Two reasons were cited for the layoffs: expected NASA budget cutbacks and the completed renovation of the third Orbiter Processing Facility which was formerly the Orbiter Refurbishment and Maintenance Facility. Lockheed subcontractors Thiokol Corp., Grumman Corp. and Johnson Controls Inc. were expected to experience another 100 layoffs. The employee reductions were expected to save KSC approximately $20 million a year. [Liden and Brown, FLORIDA TODAY, p. Sept. 21, 1991.]

September 21:

SPACE FLIGHT DEVELOPMENT

The Office of Space Flight Development has been created by NASA to oversee the development of large propulsion systems, an advanced main engine and advanced space transportation systems. Administrator **Richard H. Truly** said the new office will allow the current Office of Space Flight "to devote undivided attention to the safety and efficiency of space flight operation;" the office will retain responsibility for the Space Shuttle Program, space station and Spacelab operations and utilization, expendable launch vehicle operations and upper stages. A new associate administrator will be appointed to head the newly created office. The decision to create the new office was shared with former Chairman **Norman Augustine** and the individuals who served on the Advisory Committee on the Future of the U.S. Space Program, gathered at Kennedy Space Center. ["NASA Creates New Office," FLORIDA TODAY, p. 10E, Sept. 22, 1991.]

MORGAN WINS SNOOPY AWARD

USBI Co. Project Planner **William Oscar Morgan Jr.** was presented NASA's Manned Flight Awareness "Silver Snoopy" award recently by astronaut **G. David Low.** "Your technical expertise," said Low at the presentation, "and attention to detail had proven invaluable in ensuring astronaut safety and mission success. Those of us who are astronauts thank you for the continued and outstanding support you have given us through your work." ["USBI Co. Planner Wins Silver Snoopy," FLORIDA TODAY, Sept. 22, 1991.]

NOV. 19: NO GO FOR ATLANTIS

"We know we won't be able to make Nov. 19 [for the launch of Atlantis' STS 44 mission]. We're probably going to be a few days past that, but we think it will only be a couple of days," said Kennedy Space Center spokeswoman **Lisa Malone.** The launch date hangs on the completion date for workers in an OPF

hangar who are reinstalling a heat protection panel which had cracked. The panel, which was sent to California for repairs, is made of reinforced carbon and is located on the Orbiter's belly between the nose cap and the nose landing gear. The panel's installation proved difficult for workers previously; it took several days longer than planned. The work procedures have been refined since then, but officials say the job is still a difficult one and may again take longer than planned, according to Malone. NASA managers would like to launch STS 44 before Thanksgiving; if that cannot occur, the launch would be scheduled about December 5. [Banke, FLORIDA TODAY, p. 1A, Sept. 22, 1991.]

[] **DISCOVERY FERRY FLIGHT UPDATE**

In California, Kennedy Space Center workers are slightly ahead of schedule in readying Discovery for its return flight to Florida, officials said. They reported the possibility of a takeoff late on September 23 with an overnight stay in Texas. That would return Discovery aboard its Shuttle Carrier Aircraft on the afternoon of September 24. [Banke, FLORIDA TODAY, p. 1A, Sept. 22, 1991.]

September 22: **DISCOVERY AT DRYDEN**

Turnaround operations are continuing to prepare Discovery for the return trip to Florida. The cross-country ferry flight is scheduled to begin early tomorrow morning. Pending favorable weather conditions, a one-day ferry flight is possible. However, officials are concerned about a low pressure system in the southwest and a cold front in the southeast. Weather forecasters are assessing the possibility of thunderstorms, rain and turbulence in the Orbiter's flight path. The tail cone has been installed over the three main engines and the Orbiter is mated to its 747 Shuttle Carrier Aircraft. Whenever Discovery arrives in Florida it will be towed to the space center's new $170 million Orbiter Processing Facility Hangar No. 3; it will become the first Orbiter to be processed for flight in the new facility. Columbia spent a day in the facility for fit checks before it was flown to California for major modifications; officials are confident the new facility will not present any new problems. **Chris Fairey**, Discovery Processing Manager, said, "At this point no one thinks we should have any large problems. It's just a gorgeous facility. We're kind of excited about it." According to current planning schedules, Discovery should spend about 79 days in the new facility being readied for its International Microgravity Mission. It should be moved to the VAB on December 15, rolled out to the launch pad on December 20 and launched January 22.
Meanwhile, in Florida, the STS 48 solid rocket boosters have been disassembled at Hangar AF at the Cape Canaveral Air Force Station. Technicians are scheduled to install end rings on the segments and prepare them for shipment back to Thiokol in Utah for refurbishment. The nose cones and aft skirts will be refurbished locally by USBI. [KSC SHUTTLE STATUS REPORT, 10 a.m., Sept. 23, 1991, Banke, FLORIDA TODAY, p. 2A, Sept. 23, 1991.]

[] **ATLANTIS PREPARATIONS: STS 44**

Functional tests of Atlantis' external tank doors have been completed; in addition,

functional tests of the waste containment system are complete as is the check out of the orbital maneuvering system. Work in progress for the STS 44 mission includes: preparations to service the freon coolant loop system; preparations to install the chin panel; installation of window no. 5 (the pilot's window); leak checks of helium tanks in the Orbiter's midbody and checks of reinforced carbon gap filler panels on the wings. Leak and functional tests have been scheduled for the water spray boilers. [[KSC SHUTTLE STATUS REPORT, 10 a.m.,Sept. 23, 1991.]

ENDEAVOUR PROCESSING

The left hand external tank door has been installed and the orbital maneuvering system oxidizer crossfeed system of Endeavour has been flushed. The fuel crossfeed system is also scheduled to be flushed. A number of other processing operations are underway on Endeavour; among these are: the installation of the Ku-band drive assembly; preparations for leak and functional tests of the auxiliary power units; rigging of the external tank doors; preparations to install the remote manipulator system; installation of the fuel cells; installation of thermal control blankets in the Orbiter's midbody; and main propulsion system work. [KSC SHUTTLE STATUS REPORT, 10 a.m., Sept. 23, 1991.]

STS 44: SOLID ROCKET BOOSTERS

Atlantis has had its left forward assembly/nose cone mated to the booster. Preparations are underway to mate the external tank to the boosters. Mating of the external tank to the solid rocket boosters is scheduled for September 26, 1991. [KSC SHUTTLE STATUS REPORT, 10 a.m., Sept. 23, 1991.]

September 24: DISCOVERY AT DRYDEN

Discovery began its cross-country ferry flight today with a departure from Edwards Air Force Base, CA, at about 12:30 p.m. EDT. Weather, however, forced a landing at Tinker Air Force Base (Oklahoma City, OK). Discovery is expected to return to KSC tomorrow about 12 noon. Once here, the Shuttle will be towed to the Mate Demate Device and removed from the 747 Shuttle Carrier Aircraft. The Orbiter will be towed to OPF Bay 3 for post-flight inspections. [KSC SHUTTLE STATUS REPORT, 10 a.m., Sept. 24, 1991, "Discovery to Head Home," FLORIDA TODAY, p. 4A, Sept. 24, 1991, Banke, FLORIDA TODAY, p. 2A, Sept. 25, 1991, "Weather May Get in Way for Shuttle's Trip Home," THE ORLANDO SENTINEL, p. A-10, Sept. 25, 1991.]

STS 44: ATLANTIS STATUS

The Space Shuttle Atlantis, currently being readied for its STS 44 mission, has had its freon coolant loop no. 2 serviced. In addition, technicians have removed a leaking oxidizer thruster on the left orbital maneuvering system pod. Work in progress includes: installation of heat shields around the three main engines; installation of the chin panel; installation of window no. 5 (the pilot's window); leak checks of helium tanks in the midbody; checks of reinforced carbon-carbon gap

filler panels on the wings. Scheduled work includes: the replacement of an oxidizer thruster on the left orbital maneuvering system pod; leak and functional tests of the water spray boilers. [KSC SHUTTLE STATUS REPORT, 10 a.m., Sept. 24, 1991.]

STS 49: ENDEAVOUR STATUS

Technicians in OPF Bay 2 have installed the commander and pilot seats in the Space Shuttle Endeavour, in preparation for its maiden flight, STS 49. Work currently underway includes: installation of the Ku-band drive assembly; preparations for leak and functional tests of the auxiliary power units; rigging of the external tank doors; preparations to install the remote manipulator system; installation of the fuel cells; installation of thermal control blankets in the midbody; main propulsion system; a flush of the orbital maneuvering system fuel crossfeed system. The robot arm is scheduled for installation on September 26. [KSC SHUTTLE STATUS REPORT, 10 a.m., Sept. 24, 1991.]

September 25: DISCOVERY'S FERRY FLIGHT

The Space Shuttle Discovery (OV 103) departed Tinker Air Force Base (Oklahoma City, OK) at 1 p.m. EDT enroute to Columbus Air Force Base (Columbus, MS) where the vehicle will remain overnight because of adverse weather in the flight path to Florida. Weather will be assessed once at Columbus to determine weather conditions tomorrow and at departure times. The Orbiter departed Edwards Air Force Base (CA) at about 12:39 p.m. EDT yesterday and landed at Biggs Army Air Field (El Paso, TX) for a brief refueling stop for the 747 Shuttle Carrier Aircraft. The 747 and Shuttle departed Biggs at 4:41 p.m. EDT yesterday and remained overnight at Tinker Air Force Base (Oklahoma City, OK). Discovery, atop the SCA, arrived at Columbus Air Force Base (Columbus, MS) at 2:32 p.m., EDT. After arrival at Kennedy Space Center tomorrow, Discovery will be demated from the Shuttle Carrier Aircraft and towed to OPF Bay 3. [KSC SHUTTLE STATUS REPORT, September 26, 1991, KSC SHUTTLE STATUS REPORT, 3:30 p.m., Sept. 25, 1991, "Weather Might Stop Discovery," FLORIDA TODAY, p. 4A, Sept. 26, 1991.]

ATLANTIS IN OPF BAY 2

During structural inspections, cracks were observed on the inside of several RCC T-seal panels on left and right wings of the Space Shuttle Atlantis during preparations for its upcoming STS 44 mission. "This is something new for us. We have not seen this problem before," said Kennedy Space Center spokeswoman **Lisa Malone.** The T-seals prevent the direct flow of the hot gas on the wing leading edge cavity during reentry. There are 22 seals per wing and plans are in work to remove all of them for inspection. Officials are gathering information to indicate the kinds of loads the T-seals are under during ground operations as well as during launch, ascent, mission operations and reentry. Measurements are being made of the gap between T-seals and the reinforced carbon-carbon panels. Pre-launch and post-flight measurements will be compared. Installation

procedures also are being reviewed. Once the data is collected, officials will determine the next course of action. Possible schedule impacts - if any - have not been determined.

"We're going to open up all of the panels on Atlantis, collect a bunch of data and try to make some decisions," said Shuttle Processing Manager **Conrad Nagel.** "We've got our work cut out for us." He added, "We're going to be a whole lot smarter on Monday or Tuesday," referring to the inspections and tests which will be conducted September 30 and October 1. Other processing work in progress includes: installation of heat shields around the three main engines; installation of the chin panel; installation of window no. 5; leak checks of helium tanks in the midbody; removing the reinforced carbon-carbon gap T-seal panels on the wings. OPF Bay 2 workers are scheduled to replace an oxidizer thruster on the left orbital maneuvering system pod. [KSC SHUTTLE STATUS REPORT, 3:30 p.m., Sept. 25, 1991, Banke, FLORIDA TODAY, p. 4A, Sept. 26, 1991.]

[] **ENDEAVOUR PROCESSING: STS 49**

Fuel cells no. 1 and 3 have been installed in the Space Shuttle Endeavour in OPF Bay 1. Work in progress for the STS 49 mission includes: preparations for leak and functional tests of the auxiliary power units; rigging of the left hand external tank door; preparations to install the remote manipulator system; installation of the fuel cell no. 2; leak checks of the main propulsion system pneumatic system; a flush of the orbital maneuvering system fuel crossfeed system. Workers will install the robot arm on September 26. [KSC SHUTTLE STATUS REPORT, 3:30 p.m., Sept. 25, 1991.]

September 26: **ATLANTIS PROCESSING WORK**

The removal and replacement of Inertial Measurement Unit #3 and the retesting of oxidizer thruster on left OMS pod has been completed in the processing of Atlantis in OPF Bay 2. Work in progress includes: removal and inspection of right and left wing T-Seal panels; realignment of #5 window; midbody closeouts; foaming of main propulsion system lines; retest of Inertial Measurement Unit #3; testing of orbiter hydraulics; mating of external tank to solid rocket boosters in the Vehicle Assembly Building. The Crew Equipment Interface Test (CEIT) is scheduled for October 5-6. [KSC SHUTTLE STATUS REPORT, September 26, 1991.]

[] **ENDEAVOUR: FUEL CELL #2 INSTALLED**

Fuel cell number 2 has been installed upon Space Shuttle Endeavour; in addition, contamination checks of OMS Crossfeed Lines have been completed. Work in progress includes: thermal protection system tiles; rigging of the left hand external tank door; main propulsion system pressure testing. The checkout of fuel cell #2 and installation of the remote manipulator system have been scheduled. [KSC SHUTTLE STATUS REPORT, September 26, 1991.]

NASA BUDGET AGREEMENT

House and Senate conferees met today and agreed on a 1992 NASA budget of $14.32 billion; that is $1.5 billion less than requested, but is 10 percent more than last year's budget. The Space Shuttle budget will take a $200 million hit. Kennedy Space Center has already moved to cut its budget by $20 million in anticipation of cuts in its request; Shuttle Processing Contractor Lockheed Space Operations Co. has already laid off 300 workers and another 100 layoffs are expected shortly from Lockheed subcontractors. In addition to the Shuttle budget, the National Space Plane's budget is being reduced from $47 million to $5 million; the National Launch System's funding will slip from $175 million to less than $35 million; and the Earth Observing System's resources shrink from $286 million to $271 million. NASA spokesman **Don Savage** said, "We're still studying the numbers." Congress is expected to vote on the compromise shortly and President Bush is expected to sign the bill within weeks. [Eisler, FLORIDA TODAY, p. 1A, Sept. 27, 1991.]

DISCOVERY RETURNS TO KSC

The Space Shuttle arrived at Kennedy Space Center arrived at the Shuttle Landing Facility at 1:16 p.m. Clouds and rain forecast for this area moved on through faster than expected. **Chris Fairey**, NASA's Processing Manager for Discovery, said, "It feels great to have Discovery back." He said extra post-flight inspections will be conducted on the Orbiter's heat protection system. [Banke, FLORIDA TODAY, p. 5A, Sept. 27, 1991.]

September 27:

ATLANTIS' T-SEALS REMOVED

All T-seals on the left wing of Atlantis have been removed, inspected and measured. Technicians are removing and inspecting the remaining T-seals on the right wing. About half of the seals on the right wing have already been removed. So far, a total of eight T-seals our of the 44, have cracks. The cracked seals will be shipped back to the vendor. Those seals without cracks are being reinstalled on the vehicle and spares are being installed where the cracked seals were located. Data collection and analysis is continuing to determine the cause of the cracks. Possible schedule impacts - if any - have not been determined. Window no. 5's installation has been completed; a leaking oxidizer thruster on the left orbital maneuvering system pod has been replaced on the Orbiter. Hydraulic system activities are scheduled for next week. Work in progress includes: installation of the chin panel; removing the reinforced carbon-carbon gap T-seal panels on the right wing and inspecting for cracks; tests of payload equipment on the aft flight deck; troubleshooting of the S-band antenna; leak and functional tests of the water spray boilers. [KSC SHUTTLE STATUS REPORT, 11:30 a.m., Sept. 27, 1991.]

DISCOVERY: POST-FERRY FLIGHT OPERATIONS

After Discovery and its SCA landed at Kennedy Space Center yesterday at 1:16

p.m., the Orbiter was demated overnight. Work in progress includes: removing the flight nose landing gear tires; installing the "roll-around" tires; towing the vehicle to bay 3 about noon today. Scheduled work includes post-flight inspections and removal of the tail cone early next week. [KSC SHUTTLE STATUS REPORT, 11:30 a.m., Sept. 27, 1991.]

STS 49: ENDEAVOUR IN OPF BAY 1

Fuel cell no. 2 was installed in Endeavour. Work in progress includes: flushing of the freon cooling system; cycling of the left hand external tank door; tests of the ammonia system; leak and functional tests of the auxiliary power units; preparations to install the remote manipulator system; connections of the three fuel cells; leak checks of the main propulsion system pneumatic system; a flush of the orbital maneuvering system fuel crossfeed system. The robot arm is scheduled to be installed upon Endeavour on September 30. [KSC SHUTTLE STATUS REPORT, 11:30 a.m., Sept. 27, 1991.]

THANKS, TITUSVILLE!

"It was very heartwarming to know those folks [in Titusville, FL] were going to stay up so late and keep all those lights burning in the window," said Discovery Pilot **Kenneth Reightler**. "We really appreciated that." The citizens of Titusville had been asked by Mayor **Tom Mariani** to light up the sky, "not only to welcome the crew back to Earth, but also to help guide Commander **John Creighton** toward the Kennedy Space Center runway." Creighton said, "We were all psyched up and ready to come into Kennedy, and we were kind of disappointed when it didn't happen. We came close but didn't quite make it." STS 48 concluded its mission at Edwards Air Force Base, CA, because of unacceptable weather conditions at KSC. [Banke, FLORIDA TODAY, p. 5A, Sept. 28, 1991.]

September 29: HEAT PANELS SENT TO TEXAS

By today, all 44 heat panels on Atlantis have been removed and inspected; of these, only eight were found to be cracked, according to Kennedy Space Center spokeswoman **Lisa Malone**. The cracked panels will be sent to their manufacturer in Texas and will be replaced with spares. A failure of the panels would have led to a catastrophe for the crew and the Orbiter. Investigators say they do not believe the cracks were caused by the mission itself, but may have been the result of a flaw in ground procedures. Columbia's panels have shown no cracks; Discovery and Endeavour have not yet been inspected. KSC workers have tried to fit spare panels on Atlantis' wings, but none were installed this weekend, Malone said. Fitting the custom-made panels is a lengthy, tedious process. When workers understand how long this process will take, NASA managers will be able to project a launch date for the STS 44 mission. KSC workers will continue to process Atlantis for a November 19 launch. [Banke, FLORIDA TODAY, p. 4A, Sept. 30, 1991, [KSC SHUTTLE STATUS REPORT, 10 A.M., Sept. 30, 1991, Banke, FLORIDA TODAY, p. 12A, Oct. 1, 1991.]

September 30: **DISCOVERY: OPF BAY 3**

Discovery arrived at OPF Bay 3 September 27; in the OPF it was jacked up and leveled and access to the crew compartment was established. Work in progress on the Orbiter includes: preparations to power up the vehicle; positioning of the body flap; removal of the tail cone; opened payload bay doors. Scheduled work includes: functional test of the payload bay doors; frequency response test of the aerosurfaces; post-flight inspections; removal of one of the auxiliary power units later this week. [KSC SHUTTLE STATUS REPORT, 10 A.M., Sept. 30, 1991.]

ENDEAVOUR: OPF BAY 1

The Space Shuttle Endeavour will have its robot arm installed this week. Work in progress includes: leak and functional tests of the auxiliary power units; preparations to install the remote manipulator system; electrical connections of the fuel cells; a flush of the orbital maneuvering system fuel crossfeed system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Sept. 30, 1991.]

OCTOBER

October 1: ATLANTIS PROCESSING: OPF BAY 2

The Space Shuttle Atlantis' eight T-seals with cracks have been shipped to the vendor in Dallas, TX, for analysis and thermal barriers have been installed around the Orbiter's chin panel. Work in progress on the vehicle includes: a brake anti-skid test; functional tests of the inertial measurement units; self-test of the Ku-band antenna; reinstalling the reinforced carbon T-seals on the Orbiter's wings; installation of carrier panels around the RCC leading edges; troubleshooting of the S-band antenna; servicing of the water spray boilers. The Crew Equipment Interface Test takes place this weekend with the STS-44 flight crew on hand. [KSC SHUTTLE STATUS REPORT, 10 a.m., Oct. 1, 1991.

[] DISCOVERY IN OPF BAY 3

Discovery's body flap has been repositioned in preparation for removal of the tail cone which had covered its main engines during its recently completed ferry flight from California. Current work includes: removal of the tail cone; preparations to open the payload bay doors; removal of the wing leading edge tile carrier panels in preparation for inspection of several T-seals; post-flight inspections. Scheduled work includes: functional tests of the payload bay doors; frequency response test of the aerosurfaces; removal of one of the auxiliary power units later this week; inspections of several T-seals later this week. [KSC SHUTTLE STATUS REPORT, 10 a.m., Oct. 1, 1991.]

[] ENDEAVOUR IN OPF BAY 1

Endeavour has had its water dump nozzle installed in Orbiter Processing Facility Bay 1. Other scheduled installations include: fuel cell no. 2; the robot arm. Processing work underway includes: elevon cove seal leak checks; leak and functional tests of the liquid hydrogen main propulsion system; leak and functional tests of the auxiliary power units; preparations to install the remote manipulator system; electrical connections of the fuel cells and blowdowns of the main propulsion system helium system. [KSC SHUTTLE STATUS REPORT, 10 a.m., Oct. 1, 1991.]

[] CRACKS FOUND IN COLUMBIA PANELS

Inspections of the Space Shuttle Columbia have revealed cracks in three of 44 of its heat-protection panels; Columbia is presently being modified and refurbished in California where it was manufactured originally. The cracks on Columbia's panels are reported to be small. The cracks on eight of Atlantis' panels range in size from microscopic to four inches long and are in nearly identical places toward the outer tips of the vehicle's wings; there are four cracked panels on each wing. Kennedy Space Center spokesman **Bruce Buckingham** said today, "It doesn't seem to be a random problem. There appears to be some symmetry." Though the cause of the cracks is still under investigation, some engineers believe that the

cracks may have resulted from improper installation. Buckingham said that rollover to the Vehicle Assembly Building, currently slated for October 17, may be delayed a few days to allow technicians time to replace the cracked panels. [Brown, FLORIDA TODAY, p. 2A, Oct. 2, 1991.]

October 2: **BUDGET MAY DELAY 1992 LAUNCH**

Officials at NASA said today that Congress's order to cut $330 million from its budget might result in the delay of at least one Shuttle launch between now and next September. "We have people looking at the various options. When you have a budget cut, you either don't do things as often, defer work or don't start new projects as soon," said NASA spokesman **Ed Campion**. Kennedy Space Center has already made cuts which have resulted in 400 workers being laid off at a savings of an estimated $20 million. Director **Forrest S. McCartney** said the budget for the center is still under review but sees no prospect of further layoffs. "We've already taken action to live with a smaller budget," McCartney said. "It's really too early to tell, but so far it doesn't look like we'll have any further significant impact." [Brown, FLORIDA TODAY, p. 1A, Oct. 3, 1991, "NASA Wins, Loses in 1992 Budget Battle," FLORIDA TODAY, p. 10E, Oct. 6, 1991, Brown, FLORIDA TODAY, p. 1A, Oct. 6, 1991.]

STS 44 MAY BE DELAYED

Atlantis' cracked T-seals are being replaced by technicians in Orbiter Processing Facility Bay 2, but officials continue discussing a possible delay for the STS 44 mission currently targeted for November 19. **Lisa Malone**, NASA spokeswoman, said, "We don't have a crystal ball; it's too early to tell whether this will affect the schedule." The replacement of T-seals is expected to be completed October 4, Malone said. She also said that a total of nine cracked T-seals had been found on Columbia which is undergoing extensive modification in California. Discovery's T-seals will be inspected next week. [Halvorson, FLORIDA TODAY, p. 6A, Oct. 3, 1991, Date, THE ORLANDO SENTINEL, Oct. 3, 1991.]

CREW EQUIPMENT INTERFACE TEST: STS 44

This weekend the STS 44 crew of Atlantis will be at Kennedy Space Center to take part in a Crew Equipment Interface Test (CEIT). Technicians have just completed installing thermal barriers around the Orbiter's chin panel. Work in progress includes: replacement of cracked T-seals; a brake anti-skid test; functional tests of the inertial measurement units; hot lube oil flush of the auxiliary power unit system no. 2; installation of carrier panels around the RCC leading edges. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 2, 1991.]

DISCOVERY'S TAIL CONE REMOVED

The tail cone which protected Discovery's main engines during its ferry flight from California has been removed in OPF Bay 3. Currently, technicians are inspecting payload bay door hinges and preparing to open the doors, conducting a flight

readiness test of the aerosurfaces, removing the wing leading edge tile carrier panels in preparation for inspecting Discovery's T-seals; waterproofing the payload bay doors and are continuing post-flight inspections. In the next few days, OPF Bay 3 workers will conduct functional tests of the payload bay doors, remove one of the auxiliary power units and begin inspecting T-seals. [KSC SHUTTLE STATUS REPORT, 10 a.m., Oct. 2, 1991.]

ENDEAVOUR: LEAK CHECKS

In Orbiter Processing Facility Bay 1, the Space Shuttle Endeavour is undergoing, among other things, a variety of tests and checks including: elevon cove seal leak checks; leak and functional tests of the liquid hydrogen main propulsion system; leak and functional tests of the auxiliary power units; preparations to install the remote manipulator system; checks of the main propulsion system pneumatic system. The robot arm will be installed next week while the right orbital maneuvering system pod will be installed this weekend. [KSC SHUTTLE STATUS REPORT, 10 a.m., Oct. 2, 1991.]

October 3: NASA MANAGEMENT SYSTEMS OFFICE

NASA Administrator **Richard H. Truly** announced today the intended creation of the Office of Management Systems and Facilities. This Office will represent the consolidation of the Offices of Management and Headquarters Operations. **Benita A. Cooper** has been selected to be the Associate Administrator for this new organization. She is currently the Assistant Administrator for the Office of Headquarters Operations. Prior to assuming her current position at Headquarters, Cooper was the Director of Management Operations at Goddard Space Flight Center from 1880-88. Dr. **C. Howard Robbins Jr.**, currently the Associate Administrator for the Office of Management, will be on a special assignment for the Office of Management, will be on a special assignment to assist the Deputy Administrator in ensuring smooth organizational transition activities at NASA Headquarters, and then will be returning to a senior technical position. Dr. Robins worked at the Langley Research Center and the Johnson Space Center prior to transferring to Headquarters in 1976 where he managed programs in the Office of Aeronautics and Space Technology and Space Science and Applications.

This new Office of Management Systems and Facilities will provide synergy between operational responsibilities and Agency policy development in the areas of Information Systems, Facilities and Maintenance, Logistics, Aircraft Management, and Security. The Office also will be responsible for Industrial Relations, the Board of Contract Appeals, and the Inventions and Contributions Board. The NASA Headquarters Equal Opportunity function will be consolidated within the existing Office of Equal Opportunity Programs. In announcing this intended consolidation, Admiral Truly said, "Benita Cooper is a natural choice to lead this new organization, which will nicely complement our Office of Human Resources and Education. Both she and Howard Robins have played a major role in making this consolidation a success. This will greatly facilitate our efforts to enhance total quality management in NASA's institutional management.

"With today's announcements of new appointments and office consolidation at NASA Headquarters, I will have in place an extremely strong team that will enhance NASA's overall program and personnel management. This restructuring culminates other changes earlier in the year. It is consistent with the recommendations from external advisory groups and with my intention to better align our capabilities to successfully oversee the implementation of today's program's and plan for the missions of tomorrow." [NASA/KSC News Release No. 91-160, Oct. 3, 1991, NASA/KSC News Release No. 91-162, Oct. 3, 1991, "NASA Veteran to Head New Major Projects Office," FLORIDA TODAY, p. 9E, Oct. 7, 1991.]

STS 44/ATLANTIS

Technicians have completed the brake anti-skid test on the Space Shuttle Atlantis (OV-104); they have also conducted a hot lube oil flush of auxiliary power unit no. 2 and functional tests of the inertial measurement units. Processing managers have set a goal of having all T-seals and reinforced carbon panels installed on both wings of the Orbiter by the end this week. Other work in progress in OPF Bay 2: cycles of the nose landing gear doors; potable water servicing; inspections of the payload bay door hinges; reinstalling the T-seals on the wings of Atlantis and the installation of carrier panels around the RCC (Reinforced carbon carbon) leading edges. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 3, 1991.]

STS 42/DISCOVERY STATUS

The Space Shuttle Discovery (OV-103) is currently being worked on in Orbital Processing Facility Bay 3; activities include: inspections of payload bay door hinges; flight readiness test of the aerosurfaces; preparations to open the payload bay doors; removal of the wing leading edge tile carrier panels; waterproofing the payload bay doors; inspections of the RCC T-Seals. Functional tests of the payload bay doors are scheduled as is the removal of one of the auxiliary power units later this week. NASA spokeswoman **Lisa Malone** said today that a crack had been found on one of Discovery's wings; it was spotted in one of five seals inspected. The remainder of the seals will be inspected next week. A team of engineers is studying the problem at Johnson Space Center and suspect that the cracks may have been caused during installation. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 3, 1991, Banke, FLORIDA TODAY, p. 5A, Oct. 4, 1991, "Cracked Seals Found on Another Shuttle," THE NEW YORK TIMES, p. A15, Oct. 4, 1991.]

ENDEAVOUR PROCESSING

In OPF Bay 1, workers are processing the Space Shuttle Endeavour for its maiden voyage next year - STS 49. The work in progress includes: elevon cove seal leak checks; leak and functional tests of the liquid hydrogen main propulsion system; leak and functional tests of the auxiliary power units; preparations to install the remote manipulator system and checks of the main propulsion system pneumatic

system. Scheduled work includes: installation of the robot arm next week; installation of the right orbital maneuvering system pod this weekend and installation of fuel cell no. 2. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 3, 1991.]

October 4: **STS 44 PROCESSING: ATLANTIS**

The Crew Equipment Interface Test is scheduled for this weekend and the members of the STS 44 crew will attend; technicians have also set a goal of having all T-seals and reinforced carbon carbon panels installed on both wings by this weekend. Work in progress includes: servicing of the environmental control life support system with gaseous nitrogen; checks of the cabin pressure; cycles of the nose landing gear doors; potable water servicing. The reinstallation of T-seals and carrier panels around the RCC leading edges is about 50 percent complete. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 4, 1991.]

[] **DISCOVERY IN OPF BAY 3**

A frequency response test of Discovery's flight control system has been completed in Orbiter Processing Facility Bay 3. Processing activity for Discovery's STS 42 (IML) mission continues in a number of areas: preparations to offload residual propellant from the auxiliary power units and the orbital maneuvering system; inspections of payload bay door hinges; flight readiness test of the aerosurfaces; preparations to open the payload bay doors; removal of the wing leading edge tile carrier panels; waterproofing the payload bay doors; inspections of the RCC T-seals. Out of ten T-seals removed only one, on the left wing, was cracked. Only one more T-seal is scheduled for inspection. Technicians have scheduled functional tests of the payload bay doors and removal of one of the auxiliary power units later this week. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 4, 1991.]

[] **STS 49: ENDEAVOUR'S INTELSAT REBOOST**

Technicians continue processing Endeavour for its STS 49 mission next year - the Intelsat Reboost; current activities include: preparations to install the right orbital maneuvering system pod; filling and bleeding the hydraulic system; elevon cove seal leak checks; leak and functional tests of the liquid hydrogen main propulsion system; leak and functional tests of the auxiliary power units; preparations to install the remote manipulator system; checks of the main propulsion system pneumatic system. Scheduled work includes: installation of the robot arm next week; installation of the right maneuvering system pod on October 11; installation of fuel cell no. 2. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 4, 1991.]

[] **$1 MILLION FOR REPAIRS**

NASA estimates that repairs to cracked Orbiter wings will cost nearly $1 million, but officials say that Atlantis' STS 44 mission will not be delayed significantly by the cracks problem. "We think we've got an excellent shot that week [November

19]," said **William Lenoir**, NASA's Associate Administrator for Space Flight. "My guess is the 21st or 22nd." According to **Keith Hudkins**, Chief of the Shuttle Division at NASA Headquarters, the Shuttles could fly and land safely with the cracked seals. "No one is looking at this as being a reason not to go fly Atlantis," he said. The cause of the cracks is still unknown, but Hudkins has said hot temperatures during re-entry may be the culprit rather than improper installation. The cracked seals will be repaired at a cost of $50,000 each and will be replaced by spares. [Banke, FLORIDA TODAY, p. 1A, Oct. 5, 1991.]

1992 LAUNCH SCHEDULE IMPACT

NASA expects to be able to keep its 1992 schedule intact, but may postpone future flights if other economic measures don't work. The space agency will reduce staffing levels and inspections and cut spending by 3 percent a year over the next five years for a total savings of $1 billion. Associate Administrator for Space Flight **William Lenoir** said, "Frequently, we're not doing things as efficiently as we can be. We find lots of cases...where we're inspecting the same system three times. We've got to be very careful we don't do anything that compromises safety, and I'm convinced we won't." More than 400 employees have been laid off from the Shuttle Processing Contract headed by Lockheed Space Operations Co (Titusville, FL). BAMSI Inc. (Titusville, FL), an engineering firm, will lay off 95 persons by the end of next month. A plan to consolidate Shuttle support services is under consideration at Kennedy Space Center. Lenoir said, "It is going to be very tight." [Eisler, FLORIDA TODAY, p. 1A, Oct. 5, 1991.]

October 5: **SLAYTON SUPPORTS AMF**

"Space is the centerpiece of the future and the centerpiece of things we are interested in education. The timing is right for this foundation [Astronauts Memorial Foundation] to do what it is on track with," said former Mercury and Apollo-Soyuz astronaut **Donald "Deke" Slayton** at the AMF's fifth annual banquet at the Cocoa Beach Howard Johnson Plaza-Hotel tonight. **Ed White**, son of the late Apollo astronaut of the same name, presented AMF with a check for $25,000 which he raised from the sale of astronaut trading cards marketed by his firm, Space Ventures Inc. **Ed White, Sr.** is one of 15 astronauts honored with his name on the Astronauts Memorial at Spaceport USA. ["Astronaut Gives Support to Foundation," FLORIDA TODAY, p. 2B, Oct. 6, 1991.]

October 6: **LOCKHEED ENVISIONS SMALLER SHUTTLE**

Lockheed Advanced Development Co. (informally known as the Skunk Works) has begun work on a $1.7 million feasibility study for a smaller version of the Space Shuttle. The smaller craft would carry a two-person crew and up to eight passengers along with a limited cargo on missions to and from low Earth orbit. ["Skunk Works Begins Spaceship Study," FLORIDA TODAY, p. 10E, Oct. 7, 1991.]

STS 44 LANDING AT KSC

Atlantis will land at Kennedy Space Center at the conclusion of its upcoming STS 44 mission. As currently scheduled the landing would occur at 3:27 p.m. on November 29. The mission was originally scheduled to land at Edwards Air Force Base, CA, until Kennedy Space Center was made the primary landing site for Orbiters. "The prime landing site was switched accordingly to KSC," said NASA spokesman **James Hartsfield**. This will mark the third scheduled KSC landing this year; earlier, Atlantis was landed as scheduled on August 11 and Discovery was diverted from Kennedy Space Center to Edwards on September 18 due to cloudy skies and rain showers. [Halvorson, FLORIDA TODAY, p. 10E, Oct. 7, 1991.]

ALDRICH HEADS NEW NASA OFFICE

Arnold Aldrich has been named by NASA Administrator **Richard H. Truly** to head the newly created Office of Space Systems Development where he will oversee the development of such big projects as Space Station Freedom. Aldrich will pick up some of the responsibilities of Associate Administrator **William Lenoir**, who heads the Office of Space Flight. Lenoir will continue to direct Space Shuttle operations. ["NASA Veteran to Head New Major Projects Office," FLORIDA TODAY, p. 9E, Oct. 7, 1991.]

October 7:

ATLANTIS PROCESSING: OPF BAY 2

A number of processing tasks for STS 44 (Atlantis) have been completed: the Crew Equipment Interface Test; the auxiliary power unit no. 3 was installed and electrically mated; the vehicle's thermal protection system was waterproofed; a functional test was conducted of the crew module hatch and technicians installed and tested several small pyrotechnic devices in the Orbiter. Current activities include: a positive pressure test of the Orbiter's wings; cleaning of the midbody; reinstalling the reinforced carbon carbon T-seals and panels on the Orbiter's wings; installation of carrier panels around the RCC leading edges; repairs of minor dings in the radiators; servicing the Orbiter with potable water. Atlantis is scheduled to be transferred to the Vehicle Assembly Building by October 18. "The work is going excellently. It's looking really good," said **Bill Chatterly**, Atlantis' manager with Lockheed Space Operations Co. Space Shuttles Discovery and Columbia have been inspected for cracks in T-seals, but NASA managers have not yet decided when to start inspecting Endeavour for cracked thermal protection seals. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 4, 1991, Brown, FLORIDA TODAY, p. 4A, Oct. 7, 1991, Banke, FLORIDA TODAY, p. 4A, Oct. 8, 1991.]

DISCOVERY PROCESSING: OPF BAY 3

In Orbiter Processing Facility Bay 3, technicians have drained residuals from the auxiliary power unit catch bottles on Discovery and from its orbital maneuvering system and reaction control system tanks. They have also removed one of the auxiliary power units. Work in progress includes: opening the payload bay doors; preparations to perform a functional test of the payload bay doors;

removing STS 48 payload equipment from the payload bay; post-flight inspections and testing; inspections of the RCC T-seals. One T-seal was found cracked out of the elevon seals inspected so far; all 42 T-seals will be inspected. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 4, 1991.]

ENDEAVOUR (OV-105): OPF BAY 1

Fuel cell no. 2 has been installed on Endeavour. Work in progress includes: installation of wing struts; filling and bleeding of the hydraulic system; elevon cove seal leak checks; leak and functional tests of the liquid hydrogen main propulsion system; leak and functional tests of the auxiliary power units; preparations to install the remote manipulator system; checks of the main propulsion system pneumatic system. The Orbiter's robot arm has been scheduled for installation. Also scheduled is the installation of the right orbital maneuvering system pod. The oxidizer primary and secondary seals are leaking and need to be replaced. This will delay the installation of the pod by one to two weeks. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 4, 1991.]

October 8:

ATLANTIS IN OPF BAY 2

The Space Shuttle Atlantis has been hooked up to auxiliary power unit no. 1 and a positive pressure test has been conducted on the Orbiter's wings. Technicians in the OPF are: cleaning of the midbody; reinstalling the reinforced carbon carbon T-seals and panels on the Orbiter's wings; installing carrier panels around the RCC leading edges; repairing minor dings in the radiators; servicing the Orbiter with potable water and closing out the aft compartment. Scheduled work includes a functional test of the landing gear later this week and the transfer of Atlantis to the VAB is targeted for the end of next week. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 8, 1991.]

DISCOVERY'S PAYLOAD BAY DOORS OPEN

Technicians in Orbiter Processing Bay 3 have opened the payload bay doors and performed a functional test on Discovery. In progress: post-flight measurements and inspections of the 17-inch disconnects; removing STS 48 payload equipment from the payload bay; post-flight inspections and testing; preparations to inspect the reinforced carbon carbon T-seals on the leading edges of the wings. One T-seal was found cracked out of the eleven seals inspected so far. All 42 T-seals will be inspected. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 8, 1991.]

ENDEAVOUR PROCESSING: OPF BAY 1

In Orbiter Processing Facility Bay 1, the Space Shuttle Endeavour is being readied for its STS 49 mission: rigging of the left external tank door; inspections of the gaseous oxygen main propulsion system; installation of wing struts; filling and bleeding of the hydraulic system; elevon cove seal leak checks; leak and functional leaks of the liquid hydrogen main propulsion system; leak and functional tests of the auxiliary power units; checks of the main propulsion system

pneumatic system. Scheduled work includes: installation of the robot arm and installation of the left orbital maneuvering system pod this coming weekend. The right pod is scheduled to be installed the following weekend. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 8, 1991.]

HOLIDAY MIGHT DELAY STS 44

NASA's may take advantage of the Thanksgiving holiday to delay the expected November 19 launch of STS 44; the delay would mean that landing crews at both Kennedy Space Center and Edwards Air Force Base, CA, would not have to work during the holiday and would save NASA the extra expense of holiday pay. **Conrad Nagel**, NASA Processing Manager for Atlantis, said, "If there's any way we can make that [delay] happen, we'd love to do it." A firm launch date will not be set until the Flight Readiness Review in early November. "In the meantime, we're going to keep going toward the 19th. We're in good shape, but we're busy, real busy," Nagel added. Another potential delay for the launch results from the replacement of an auxiliary power unit with one taken from Discovery following its landing in California last month. Atlantis' original APU failed a test, Nagel explained. The replacement is a hazardous operation which requires the Orbiter Processing Unit to be cleared of nonessential personnel. Atlantis is expected to be rolled from OPF Bay 2 to the Vehicle Assembly Building on October 18 and to Launch Complex 39A five days afterward. [Banke, FLORIDA TODAY, p. 4A, Oct. 9, 1991.]

October 9:

ATLANTIS: TIGHT WORK SCHEDULE

"We've got a full slate for the next two weeks," said NASA spokeswoman **Lisa Malone** concerning the processing effort underway for the STS 44 mission of Atlantis. "Our processing for Atlantis is moving right along," she said. A firm launch date for the STS 44 mission will be set following the Flight Readiness Review currently scheduled for November 5-6. Today, technicians in OPF Bay 2 cleaned the 60-foot-long cargo bay and worked on the following additional processes: closeouts of the thermal protection system around the vehicle's chin panel; replacement and retest of several check valves in the main propulsion system; cleaning of the payload bay area; reinstalling of the reinforced carbon carbon T-seals and panels on the wings of Atlantis; installation of carrier panels around the RCC leading edges; closing out the aft compartment. Scheduled work includes: functional test of the galley; functional test of the landing gear later this week; final payload bay door closure early next week; determining the orbiter's weight and center of gravity; transfer of Atlantis to the VAB continues to be targeted for October 18. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 9, 1991, Banke, FLORIDA TODAY, p. 6A, Oct. 10, 1991.]

DISCOVERY IN OPF BAY 3

In Orbiter Processing Bay 3 technicians working on the Space Shuttle Discovery (OV 103) opened the vehicle's payload bay doors and performed a functional test earlier this week. Work in progress includes: post-flight measurements and

inspections of the 17-inch disconnects; removing STS 48 payload equipment from the payload bay; preparations to inspect the reinforced carbon carbon T-seals on the leading edges of the wings; removal of carrier panels from around the main engines; reconfiguration of the aft flight deck; post-flight inspections and testing. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 9, 1991.]

ENDEAVOUR (OV 105) PROCESSING

Work in progress in OPF bay 1 on the Space Shuttle Endeavour (OV 105) includes: rigging of the left external tank door; inspections of the gaseous oxygen main propulsion system; installation of wing struts; filling and bleeding of the hydraulic system; elevon cove seal leak checks; leak and functional tests of the liquid hydrogen main propulsion system; leak and functional tests of the auxiliary power units; checks of the main propulsion system pneumatic system. Scheduled work includes: installation of the robot arm and of the left orbital maneuvering system pod this weekend and of the right pod next weekend. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 9, 1991.]

NASA LEADERSHIP MEETING

NASA Administrator **Richard H. Truly** met today with senior NASA Headquarters and field center executives in Washington, D.C., to receive and discuss Deputy Administrator **James R. Thompson's** interim viewpoints on roles and responsibilities of NASA centers and Headquarters offices. Truly had assigned this comprehensive review to Thompson earlier this year as a result of key recommendations of the Advisory Committee on the Future of the U.S. Space Program. At the conclusion of today's meeting, Truly asked Thompson to discuss each proposal in greater detail with the appropriate managers and to report back to him in early November with final recommendations and a proposed implementation plan."When J. R.'s review is completed, it will represent the first comprehensive look at NASA roles and responsibilities in over 10 years," Truly said. "The dialogue in today's meeting was excellent, and all of us are committed to a continually improving organization to achieve the nation's aeronautics research and civil space goals." Thompson's interim recommendations centered on reemphasizing NASA centers of excellence; a sharpened focus in science, engineering and technology; revising some responsibilities at Headquarters offices; streamlining both Space Shuttle and Space Station lines of authority; and improving overall NASA program management. NASA's recently announced changes in Headquarters management and organization are consistent with Thompson's views, and reflect the resolve of NASA's senior management to strengthen the agency's overall efficiency and effectiveness today and in the future. [NASA/KSC NEWS RELEASE NO: 91-169, October 9, 1991.]

October 10:

RCC T-SEALS/PANELS INSTALLED

In Orbiter Processing Facility Bay 2, workers have completed the installation on Atlantis of all RCC T-seals and panels on the vehicle's left wing. Technicians are also at work on the following tasks: closeouts of the thermal protection system

around the chin panel; closeouts of the payload bay area; reinstalling the reinforced carbon carbon (RCC) T-seals and panels on the Orbiter's right wing; installation of carrier panels around the RCC leading edges; measurements of the T-seals and panels; closing out the aft compartment. Scheduled tasks include: functional testing of the Orbiter's galley; functional testing of the landing gear October 11; final payload bay door closure early next week; determining of the orbiter's weight and center of gravity; transfer of Atlantis to the VAB October 18. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 10, 1991.]

[] **DISCOVERY: UARS EQUIPMENT REMOVED**

Technicians working on the Space Shuttle Discovery in OPF Bay 3 have removed the UARS support equipment from the Orbiter's payload bay; carrier panels have also been removed from around the vehicle's three main engines. Work in progress includes: checks of the Ku-band antenna drive assembly; post-flight measurements and inspections of the 17-inch disconnects; inspections of the RCC T-seals on the leading edge of Discovery's wings; reconfiguration of the aft flight deck; post-flight inspections and testing. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 10, 1991.]

[] **WORK IN PROGRESS: ENDEAVOUR (OV 105)**

In OPF Bay 1, workers have a number of tasks in progress in the processing of Endeavour for its STS 49 mission scheduled for next year. Work in progress includes: rigging of the left external tank door; inspections of the gaseous oxygen main propulsion system; installation of wing struts; filling and bleeding of the hydraulic system; elevon cove seal leak checks; leak and functional tests of the liquid hydrogen main propulsion system; leak and functional tests of the auxiliary power units; checks of the main propulsion system pneumatic system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 10, 1991.]

October 11: **ATLANTIS' GALLEY TESTED**

Technicians in OPF Bay 2 completed a functional test of the Space Shuttle Atlantis' galley and checked out auxiliary power unit no. 1. Work in progress includes: a functional test of the main landing gear; closeouts of the thermal protection system around the chin panel; closeouts of the payload bay area; reinstalling the reinforced carbon carbon (RCC) T-seals and panels on the Orbiter's right wing; installation of carrier panels around the RCC leading panels; measurements of the T-seals and panels; closing out the aft compartment. Scheduled work includes: final payload bay door closure early next week; determining the Orbiter's weight and center of gravity and the transfer of Atlantis to the Vehicle Assembly Building is targeted for October 18. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 11, 1991.]

[] **DISCOVERY IN OPF BAY 3**

A number of processing tasks are in progress upon Discovery in OPF Bay 3;

these include: preparations to perform leak checks of the orbital maneuvering system; checks of the Ku-band antenna drive assembly; post-flight measurements and inspections of the 17-inch disconnects; reconfiguration of the aft flight deck and post-flight inspections and testing. Scheduled work includes: drying of the Shuttle main engines; validation of the electrical system; leak and functional test of the main propulsion system helium system and removal of the robot arm. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 11, 1991.]

[] **WORK CONTINUES ON ENDEAVOUR (OV 105)**

Processing activities on the Space Shuttle Endeavour continue in OPF Bay 1; tasks include: installation of the inertial measurement units; checks of the communications system; inspections of the 17-inch disconnects; fitting lines for the gaseous oxygen main propulsion system; elevon cove seal leak checks; leak and functional tests of the liquid hydrogen main propulsion system; inspections of the main propulsion system pneumatic system. Scheduled work includes: installation of the robot arm and installation of both the left and right orbital maneuvering system pods over the next two weeks. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 11, 1991.

October 12: **GREENE TO HEAD EXPLORATION OFFICE**

Jay Greene has been named to be Deputy Associate Administrator of NASA's newly created Office of Exploration; he was previously Deputy Manager of the Space Shuttle Program at Johnson Space Center (Houston, TX). The Office of Exploration, headed by **Michael Griffin**, will develop future U.S. space missions including a permanently occupied base on the moon and a manned mission to Mars. ["NASA Names New Exploration Official," FLORIDA TODAY, p. 9E, Oct. 13, 1991.]

[] **CRANE ACCIDENT INJURES THREE**

Three Lockheed Space Operations Co. employees were injured in OPF Bay 3 today when a small crane fell onto a work platform near Discovery's three main engines. Each was treated for head and back injuries at Parrish Medical Center (Titusville, FL) and were released. Lockheed's spokesman **J. B. Klump** said it was company policy not to reveal the names of the workers injured in the accident. Kennedy Space Center spokesman **Dick Young** said that the Orbiter sustained no damage. The accident is under investigation. Speaking of the technician's injuries, Klump said, "I think we were fortunate. It happened right near flight hardware. We don't take this lightly." [Brown, FLORIDA TODAY, p. 4A, Oct. 13, 1991, "Crane Accident Injures 3 Working on Discovery," THE ORLANDO SENTINEL, p. A-14, Oct. 14, 1991, Klump, "LSOC Workers' Quick Action 'Saves the Day' In OPF Incident," Star Gazer, p. 3, Nov. 7, 1991.]

October 14: **ATLANTIS MOVE ANTICIPATED**

Technicians over the weekend finished installing heat-protective panels and seals

on the wings of Space Shuttle Atlantis in Orbiter Processing Facility Bay 2. Inspections showed that 8 of 42 T-seals on Atlantis had cracks; each was replaced with a spare; cracks were also found on Discovery and Columbia. Current plans continue to call for a move to the Vehicle Assembly Building on October 18. [Brown, FLORIDA TODAY, p. 4A, Oct. 15, 1991.]

EUTELSAT LAUNCH DELAYED

At Cape Canaveral Air Force Station, the launch of Eutelsat, a European communications satellite, has been delayed until early November. Eutelsat Project Manager **Jean Jacques Dumesnil** said that the delay was caused by the need to replace a faulty electronics box. The launch of this mission had originally be set for August after the spring failure of an Atlas launch. Dumesnil said the nose cone and its enclosed payload would be moved to Launch Complex 36 on October 28. [Halvorson, FLORIDA TODAY, p. 4A, Oct. 15, 1991.]

October 15:

ATLANTIS: APU CHECKS COMPLETED

Technicians working in Orbiter Processing Facility Bay 2 have completed auxiliary power unit leak checks on the Space Shuttle Atlantis in preparation for its STS 44 mission; they also completed payload bay closeouts and main landing gear functional checks. Processing workers are currently working on: flipper door closeouts; nose landing gear final functional test; aft engine compartment closeouts; last RCC panel installation today; wing tile step and gap work. Processing work yet to be completed includes: final structural leak checks; final cleaning of the payload bay; functional testing of payload bay doors and closing them for rollout; Orbiter weight and center of gravity determination; rollover to the Vehicle Assembly Building on October 18. Managers expressed a degree of optimism that the target launch date of November 19 might yet be met. Kennedy Space Center spokesman **Bruce Buckingham** said, "We're only one day off from our original rollover date. That would make it fairly comfortable for us to meet the [November] 19th." [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 15, 1991, Brown, FLORIDA TODAY, p. 5A, Oct. 16, 1991.]

ENDEAVOUR IMU'S INSTALLED

The Space Shuttle Endeavour has had its inertial measurement units installed. Technicians in OPF High Bay 1 are working on several tasks: main propulsion system checks for contamination; installation of thermal protection system blankets; hydraulic cycling of aerospace surfaces; nose wheel checks and functional tests. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 15, 1991.]

DISCOVERY: T-SEAL INSPECTIONS

The inspection of all of Discovery's T-Seals has been completed; only one was found to be cracked and will be replaced with a spare already on site at Kennedy Space Center. Discovery's water dump nozzle has also been removed. Work in progress includes: heat shield installations; Spacelab module brazing and remote

manipulator system operations. Reinstallation of the Orbiter's T-seals has been scheduled. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 15, 1991.]

[] CRANE ACCIDENT: HUMAN ERROR

Kennedy Space Center spokesman **Bruce Buckingham** today said it appeared that human error and equipment problems caused a crane accident on October 12 [see story above]. Buckingham noted that the hoist, which runs along a structural beam, apparently left its track because locks on the beam to prevent the hoist from slipping were either an improper size or missing. Two workers were injured by falling equipment and a third was injured as he successfully prevented the hoist and crane from falling off a processing platform; if it had fallen off the platform the Orbiter Discovery would have been damaged. [Brown, FLORIDA TODAY, p. 5A, Oct. 16, 1991.]

October 16: ATLANTIS: WING PANELS INSTALLED

Technicians in OPF Bay 2 have completed the final installation of the last carrier wing panels on Atlantis in preparation for its STS 44 mission next month. Other completed work includes: payload bay closeouts and cleaning; APU leak checks; tire flight pressurization; aft structural leakage test. Work in progress includes: payload bay door functional test and final closing; landing gear final functional test; aft engine compartment closeouts; wing tile step and gap work; forward compartment closeouts. Scheduled tasks include: Orbiter weight and center of gravity determinations and the rollover to the Vehicle Assembly Building October 18. [KSC SHUTTLE STATUS REPORT, 10 A. M., Oct. 16, 1991, "Atlantis Ready to Go to VAB," FLORIDA TODAY, p. 2A, Oct. 17, 1991.]

[] STS 49 PROCESSING

Endeavour's inertial measurement units have been installed during Shuttle processing in OPF High Bay 1. Technicians have also completed hydraulic fill and bleed operations on the Orbiter. Work in progress includes: main propulsion system checks for contamination; installation of thermal protection system blankets; hydraulic cycling, checks and calibrations of aerosurfaces; nose wheel checks and functional tests and wing strut inspections. Scheduled work includes: right hand OMS pod delivery to OPF October 19 and left hand pod delivery Oct. 22. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 16, 1991.]

[] DISCOVERY: WATER DUMP NOZZLE

Discovery's water dump nozzle has been removed during processing in OPF High Bay 3; all T-seals have been inspected and helium tank vents have been completed. Work in progress includes: heat shield removal; Spacelab module brazing; remote manipulator system operations; reinstallation of T-seals; tile work around nose landing gear. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 16, 1991, "Atlantis Ready to Go to VAB," FLORIDA TODAY, p. 2A, Oct. 17, 1991.]

October 17: **STS 44: LANDING GEAR TEST COMPLETED**

Shuttle processing technicians in Orbiter Processing Facility Bay 2 conducted the final landing gear functional test today. They also removed the payload bay door strongbacks; they completed the functional test, cycling and final closing of the payload bay doors; completed the installation of and checks of all wing carrier panels; completed carrier panel and tile work around the payload bay door hinges and conducted an aft structural leakage test. Technicians are continuing the following tasks: aft engine compartment closeouts; tile step and gap work; Orbiter weight and center of gravity determinations; retraction of work platforms in the VAB for Orbiter delivery October 18. Scheduled work includes: positioning the Orbiter transporter in the OPF tonight; rollover to VAB; transporting the payload to Launch Complex 39A next week; rolling out Atlantis to LC 39A at 12:01 a.m. October 24. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 17, 1991.]

[] **ENDEAVOUR PROCESSING**

Hydraulic cycling, checks and calibrations of Endeavour's aerosurfaces have been completed in OPF High Bay 1 this week; other completed operations include: nose wheel checks and functional tests; helium system checkouts; inertial measurement units installed; hydraulic fill and bleed operations. Work in progress: main propulsion system checks for contamination; installation of thermal protection system blankets; auxiliary power unit leak and functional tests; wing strut inspections; gaseous nitrogen system leak checks. The right hand OMS pod is scheduled for delivery to the OPF on October 19; the left hand pod will be delivered October 22, following final leak checks. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 17, 1991.]

[] **STS 42/DISCOVERY**

All T-seals on wing leading edges on Discovery have been inspected; technicians have also completed ventilating the helium tank and down processing of Discovery's previous mission, STS 48. Work in progress: heat shield removal on engines 1 and 2; removal of the remote manipulator arm; reinstallation of T-seals; tile work around nose landing gear; installation of dump valve nozzle; reaction control system regulator flow. Technicians will shortly close the Orbiter's payload bay doors for bulb seal measurements. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 17, 1991.]

[] **ENDEAVOUR'S FIRST LAUNCH THREATENED**

The first mission of the newest Space Shuttle, Endeavour, is currently scheduled for April 9, 1992, but hundreds of problems with the Orbiter may cause the launch to be delayed as much as two months. Nearly 1,500 problems have been reported so far, ranging from crossed electrical wires which would make parts move the wrong way to contaminated fuel lines which have had to be flushed several times. Some of the Orbiter's heat protection tiles do not fit properly, either. None of these problems is thought to be a serious flight safety issue, but

all of them must be solved before launch, NASA officials said. NASA spokesman **Ed Campion** said, "It's true we are several weeks down of where we'd like to be at this point. However, there is every reason to believe we will be able to make up that time." A number of the problems arose from decisions made to "borrow" flight hardware to use on Discovery and Columbia, so that tasks that manufacturer Rockwell International were originally supposed to complete have now been shifted to Kennedy Space Center workers. Additionally, some problems usually found and corrected by the manufacturer before delivery were not discovered until after delivery to KSC. Endeavour will be rolled to Launch Complex 39B about February 20 and readied for a crucial test-firing of its main engines on March 5. [Banke, FLORIDA TODAY, p. 1A, Oct. 18, 1991.]

October 18: **ATLANTIS MOVES TO VAB TODAY**

"It appears everything is right on schedule," said Kennedy Space Center spokesman **Bruce Buckingham** about the Space Shuttle Atlantis's scheduled move to the Vehicle Assembly Building today. The Shuttle has been bolted to the transporter and the weight and center of gravity of the vehicle has been determined. The move to the VAB should occur between noon and 1 p.m., according to Buckingham. The Orbiter will be mated to its external tank and launch platform this weekend and rolled out to Launch Complex 39A on October 24 and have its payload loaded on October 31. A Terminal Countdown Demonstration Test is scheduled for October 31-November 1. The payload is a 5,000-pound Department of Defense satellite. [Brown, FLORIDA TODAY, p. 6A, Oct. 18, 1991, KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 18, 1991.]

OPF BAY 3: DISCOVERY PROCESSING

The robot arm has been removed and the dump nozzle has been installed in the Space Shuttle Discovery in Orbiter Processing Facility Bay 3. Ongoing tasks include: removal of heat shields from around the main engines; validation of the orbiter electrical system; reinstallation of the reinforced carbon carbon T-seals and panels on the leading edges of both wings; closing of the payload bay doors. Work remaining to be completed: removal of the Shuttle main engines next week; leak and functional testing of the main propulsion system helium system; inspections of the payload bay bulb seal. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 18, 1991.]

ENDEAVOUR PROCESSING/OPF BAY 1

Nose wheel steering tests on Endeavour have been completed in OPF Bay 1. OMS pods remain on the schedule for installation in the Orbiter. Other work in progress: preparations to install the power reactant storage and distribution system tank set No. 3; inspections of the 17-inch disconnects; leak and functional tests of the liquid hydrogen main propulsion system; inspections of the main propulsion system pneumatic system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 18, 1991.]

NASA PROUD OF ENDEAVOUR

Despite an increasing number of problems with its newest Space Shuttle, NASA is remaining confident about capability of Endeavour to take its place in the four-vehicle fleet. "We're looking forward to tidying up what needs to be done and go fly. I think Endeavour will still prove to be the gem of the fleet," said Kennedy Space Center Director **Forrest S. McCartney**. Engineers expect the total number of problems with the new Orbiter to range between two and three thousand; Discovery had 2,788 problems and there were 2,876 with Columbia and 1,573 with Atlantis. "Make no mistake, we want our people to write up anything and everything they see on all of these vehicles. They all must be critically inspected," said McCartney. He added, "If you had left the vehicle longer on the West Coast, they would have done a lot of the work there that we are doing now." The Lockheed manager in charge of Endeavour, **Eric Clanton**, said, "When you consider the millions of man-hours that went into that vehicle, what we're finding may not be significant at all." [Banke, FLORIDA TODAY, p. 2A, Oct. 19, 1991.]

October 19: NASA MAY CLOSE A PAD

"I really think there is a good chance, better than 50-50, that we will put one pad down," said KSC Director **Forrest S. McCartney** today. The budget of Kennedy Space Center must be cut $30 million a year for each of the next five years. Closing a pad is perceived by KSC officials as one way to avoid additional layoffs. "Not laying off people is dependent on keeping the overtime down," McCartney said. At NASA headquarters, however, the attitude is different, according to McCartney. He said, "They want us to continue to work the overtime without over-stressing the work force to try to make up as much time as possible." Currently, the overtime rate at the space center is near 6 percent - down 4 percent from the previous year. "The program has got to decide whether this is worth the money or not. They've got to understand we cannot have all this flexibility we've had before and still cut the budget. It just can't be done." [Banke, FLORIDA TODAY, p. 1A, Oct. 20, 1991.]

CRIPPEN INDUCTED IN SPACE HALL OF FAME

Shuttle Program Director **Robert L. Crippen** has been inducted into the International Space Hall of Fame at the Space Center (Alamogordo, NM). Crippen, also known as "Crip," piloted the STS 1 Shuttle mission and flew three other Orbiter missions. Also inducted with Crippen were **Galileo Galilei, Alexei Isayev, Rodolfo Neri Vela** and **Robert Rushworth**. ["Robert L. Crippen Inducted into International Space Hall of Fame," FLORIDA TODAY, p. 9E, Oct. 20, 1991. [See: November 1.]

October 20: ATLANTIS PREPARED FOR TEST

The mechanical and electrical connections made today between Atlantis and its external tank and solid rocket boosters will be tested tomorrow in the Vehicle Assembly Building. Rollout to Launch Complex 39A is set for October 24 at 12:01

a.m., according to KSC spokesman **George Diller**. The Terminal Countdown Demonstration Test for STS 44 begins October 31 and the Launch Readiness Review begins November 7. [Banke, FLORIDA TODAY, p. 5A, Oct. 21, 1991.]

October 21: **GROUNDWATER CLEANUP PLAN**

NASA has been working with state and federal environmental agencies to identify areas of contaminated groundwater and to develop treatment plans, according to NASA's environmental analyst **John Ryan**. He said that NASA will explain its groundwater program and respond to questions at an informal public workshop to be held October 24 at 6 p.m. at the North Brevard Public Library (Titusville, FL). [Fiorini, FLORIDA TODAY, p. 1B, Oct. 22, 1991.]

STS 44: ATLANTIS STATUS REPORT

Atlantis completed its transfer to the Vehicle Assembly Building at 12:05 p.m., October 18. It was mated to its external tank and solid rocket boosters by 1:07 p.m., October 19 and its payload was transferred to Launch Complex 39A early this morning. A Shuttle Interface Test is currently in progress to verify critical connections between the vehicle elements and the launch platform. Atlantis is scheduled to be rolled out to LC 39A at 8 p.m., Oct. 23 and a Terminal Countdown Demonstration Test is scheduled for October 31. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 21, 1991.]

STS 42: DISCOVERY PROCESSING

Inspections of Discovery's payload bay bulb seal and validation of the vehicle's electrical system have been completed. Work in progress includes: preparations to remove the shuttle main engines; reinstallation of the reinforced carbon carbon T-seals and panels on the leading edges of both wings; open the payload bay doors; functional test of the radiators; thermal protection system operations; leak and functional tests of the main propulsion system; testing of the communications system. Technicians are scheduled to remove the Shuttle main engines on October 22 and to conduct a leak and functional test of the main propulsion system helium system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 21, 1991.]

ENDEAVOUR PROCESSING REPORT

Technicians in Orbiter Processing Facility Bay 1 are engaged in a variety of activities in processing Endeavour: leak and functional tests of the auxiliary power units; preparations to install the power reactant storage and distribution system tank set No. 3; rigging of the left external tank door; checks of the main propulsion system; inspections of the main propulsion system pneumatic system; installing strain gauges on the wings. Technicians are planning to install the right orbital maneuvering system pod this week and the left pod next week. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 21, 1991.]

October 22: ATLANTIS: SHUTTLE INTERFACE TEST

A Shuttle Interface Test is now underway in the VAB to verify critical connections between the elements of Atlantis and the launch platform. In addition, checks of the solid rocket booster thruster vector control system and leak tests of the T-zero umbilicals on the liquid oxygen tail service mast are in progress. The STS 44 cargo - a Defense Support Program satellite - has been transferred into the payload changeout room; that took place October 21. Rollout to Launch Complex 39A is scheduled for 8 p.m. October 23 with a Terminal Countdown Demonstration Test set for October 31 through November 1. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 22, 1991.]

[] DISCOVERY IN OPF BAY 3: STS 42

The drying of Discovery's engines has been completed in preparation for its STS 42 mission. Work in progress in OPF Bay 3 includes: removal of the three Shuttle main engines; reinstallation of the reinforced carbon carbon T-seals and panels on the leading edges of both wings; inspections of the radiators; thermal protection system operations; leak and functional tests of the main propulsion system; testing of the communication system. Technicians are preparing for the installation of the three Shuttle main engines beginning October 24 and for leak and functional tests of the main propulsion system helium system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 22, 1991.]

October 23: MCCARTNEY TO STEP DOWN

Kennedy Space Center Director **Forrest S. McCartney** is expected to retire soon, perhaps a year. "I've been here five years and watched 18 Shuttles lift off so far," he said of his time at the space center. "You can't do this forever. I plan on staying here and launching another eight birds." Former astronaut and the current Space Shuttle Program Director **Robert L. Crippen** is expected to be a likely successor. [Banke, FLORIDA TODAY, p. 1A, Oct. 23, 1991, SEE: October 31 and November 1.]

[] ATLANTIS ROLLS TO 39A

The Space Shuttle Atlantis, now being readied for its November 19, STS 44 mission, was rolled from the Vehicle Assembly Building to Launch Complex 39A tonight starting at 7:48 p.m. The 3.5-mile trip was expected to take about six hours. "We've got another four weeks ahead of us, including a countdown test next week and the installation of the payload in the cargo bay," said KSC spokeswoman **Lisa Malone**. "We continue to be in good shape for the November 19 target date." The Defense Support Program satellite will be loaded into Atlantis' cargo bay on October 31; the six-man crew will begin on-site training on that date as well. The Shuttle Interface Test was completed this morning at 1:00 a.m. Currently technicians are installing Atlantis' IUS flight Redundant Inertial Measurement Unit (RIMU) for the Defense Support Program (DSP). Scheduled work includes: establishment of electrical and mechanical connections once

Atlantis is at LC 39A; hot firing of an auxiliary power unit is scheduled for October 24; moving the rotating service structure into position around the vehicle to establish access and weather protection; TCDT (October 31) and FRR (November 7). [Halvorson, FLORIDA TODAY, p. 4A, Oct. 23, 1991, Banke, FLORIDA TODAY, p. 1A, Oct. 24, 1991, KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 23, 1991.]

DISCOVERY PROCESSING STATUS

Discovery's Engine #2 was transported to the Vehicle Assembly Building's main engine maintenance facility; engine #1 has also been removed and will be delivered for maintenance on October 28. Discovery's heat dissipation radiators on its payload bay doors have been inspected and an X-ray and leak check of the Orbiter's water dump nozzle has also been completed. Work in progress on Discovery includes: powered-on testing; removal of SSME #3; mating of right forward center booster segment in the VAB; reinstallation of the T-seals; routine tile work. Scheduled work includes: the installation of main engines for Discovery's STS 42 mission and a leak and functional test of the main propulsion system. [KSC SHUTTLE STATUS REPORT, Oct. 23, 1991.]

ENDEAVOUR/OV 105: PROCESSING

Endeavour has had its PRSD Tank Set #3 hydrogen tank installed; leak and functional checks have been completed on the Orbiter's auxiliary power units. Work in progress includes: inertial measurement unit calibrations on the flight deck; communications systems checks; liquid oxygen pneumatic system checks; drag chute fit checks; carrier panel installation. Scheduled work includes: installation of PRSD Tank Set 3 oxygen tank; installation of remote manipulator system next week; main propulsion system leak checks; arrival of right-hand OMS pod from HMF next week. [KSC SHUTTLE STATUS REPORT, Oct. 23, 1991.]

October 24: **ATLANTIS AT LC 39A**

NASA is preparing for the last launch of 1991 with Atlantis now at Launch Complex 39A. First motion of the Shuttle on its route to the pad came at 7:48 p.m. last night and the vehicle was reported hard down on the pad's pedestals at 2:05 a.m. Atlantis is being prepared for its STS 44 Department of Defense mission; launch is set for November 19. [SEE: Flight Readiness Review, November 7.] The primary objective of the mission is to deploy the Department of Defense Support Program (DSP) satellite from Atlantis'; the satellite, which arrived at the pad on October 21, will be loaded into the Orbiter's payload bay on October 31. STS 44 flight crew members are scheduled to arrive at KSC October 29 at 4:30 p.m., to participate in the Terminal Countdown Demonstration Test, a full dress rehearsal of launch day activities. While at Kennedy Space Center, the crew will be trained for an emergency escape from the launch pad and will practice driving in the M113, the armored personnel carrier which serves as an astronaut rescue vehicle. In addition, Commander **Fred Gregory** and Pilot **Tom Henricks** will practice approaches to the Shuttle Landing Facility in the Shuttle

Training Aircraft. The mock countdown is set to begin at 8 a.m., October 31 and will culminate in a simulated launch after 11 a.m. EST on November 1.

Following its STS 43 mission in August, about a dozen modifications or enhancements were made to Atlantis during its two month stay in the Orbiter Processing Facility. For instance, this flight will be the first test of an improved inertial measurement unit (IMU) called HAINS (High Accuracy Inertial Navigation System). The new unit features improved performance and accuracy and was installed in the No. 3 position. The Orbiter's three redundant IMUs are part of the guidance and navigation system. Eventually all IMUs in the Shuttle fleet will be replaced with the HAINS model as part of the continuous improvement program. While in the OPF, small cracks were found in eight of the reinforced carbon carbon T-seals on the wings' leading edges. Those seals were replaced with spares. An analysis has indicated that the cracks are caused from the thermal cycling the leading edges were exposed to during re-entry. All of Atlantis' systems were fully tested while in the OPF, including both orbital maneuvering system pods and the forward reaction control system. Space Shuttle main engine locations for this flight are as follows: engine 2015 in the No. 1 position, engine 2030 in the No. 2 position, and engine 2029 in the No. 3 position. These engines were installed in September.

The Crew Equipment Interface Test with the STS 44 flight crew was conducted on October 5 in the OPF. This test provided an opportunity for the crew to become familiar with the configuration of the Orbiter and anything that is unique to the STS 44 mission. Booster stacking operations on mobile launcher platform 1 began August 26 and were completed September 20. The external tank was mated to the boosters on September 16 and Atlantis was transferred to the Vehicle Assembly Building on October 18 where it was mated to the external tank and solid rocket boosters. A standard 43-hour launch countdown, with built-in holds, is scheduled to begin three days prior to launch. During the countdown, the Orbiter's onboard fuel and oxidizer storage tanks will be loaded and all Orbiter systems will be prepared for flight. About 9 hours before launch the external tank will be filled with its flight load of a half a million gallons of liquid oxygen and liquid hydrogen propellants. About two and one-half hours before liftoff the flight crew will begin taking their assigned seats in the crew cabin. Landing of the STS 44 mission is scheduled to occur at Kennedy Space Center's Shuttle Landing Facility on the afternoon of November 29. [NASA/KSC Release No. 121-91, October 24, 1991.]

ROCKWELL: CONTRACT EXTENSION

Rockwell International Corp.'s Space Systems Division has been awarded a three-year extension of its Space Shuttle logistics operations contract worth $453.3 million. The contract runs from October 1, 1991, until September 30, 1994, and calls for the provision of spare parts for Orbiter flight, ground-support equipment, launch and landing ground-support equipment and maintenance-support equipment. Rockwell's Kennedy Space Center workforce numbers 1,375.

"Rockwell Wins NASA Contract Extension," FLORIDA TODAY, p. 12C, Oct. 24, 1991.]

PEGASUS LAUNCH PLANS

Next year, an air-launched Pegasus rocket will lift a satellite designed to monitor the Brazilian rain forests. It will be the first such launch from the Space Coast and, according to Orbital Sciences Corp. spokeswoman **Laura Ayres**, "The Cape has the best geographic location to get into the orbit the customer wants." Two previous Pegasus flights have taken place from Edwards Air Force Base (CA). Ayres said that Orbital Sciences Corp. plans to contract with NASA for launch support. [Brown, FLORIDA TODAY, p. 1A, Oct. 22, 1991.]

GROUNDWATER CONTAMINATION NOT SERIOUS THREAT

At a workshop in Titusville, FL, NASA's Environmental Analyst **John Ryan** and others described the program initiated in 1988 to clean up about 11 acres of contaminated groundwater at Wilson Corners. He said that the groundwater contaminated on NASA property in the 1960s did not pose a serious health risk. The Environmental Protection Agency monitors the cleanup program. Treated clean water is sprayed on the ground to help replenish the water supply and retard saltwater intrusion, according to Ryan. NASA hopes to expand the project to raise the number of pumps involved from five to ten. [Fiorini, Radonna, FLORIDA TODAY, p. 2B, Oct. 26, 1991.]

ATLANTIS: CARGO TO BE LOADED

A Defense Support Program satellite will be loaded into the payload bay of the Space Shuttle Atlantis in preparation for its STS 44 mission, scheduled for November 19. **Lisa Malone**, KSC spokeswoman, said, "The rollout was uneventful." The rollout came about four hours ahead of schedule because technicians were able to attach the vehicle to its external tank and solid rocket boosters and test the connections more quickly than anticipated. The Shuttle was reported hard down on the pad's pedestals at 2:05 this morning. At the pad technicians also tested one of the Orbiter's APUs; the seven-minute test was required because the unit had been borrowed from Discovery. After the test, the Rotating Service Structure was moved into place around the Orbiter; the RSS protects the vehicle from bad weather and allows technicians to continue preparing the Space Shuttle for launch. Scheduled work includes: opening of the payload bay doors tomorrow; helium signature leak test of the main propulsion system and main engines on Sunday (October 27); loading of hypergolic propellants into the Orbiter next week; Terminal Countdown Demonstration Test (October 31); installation of Defense Support Satellite into the payload bay October 31. [Banke, FLORIDA TODAY, p. 2A, Oct. 25, 1991, KSC SHUTTLE STATUS REPORT, 11 A.M., Oct.24, 1991.]

IML-1/STS 42: DISCOVERY PROCESSING

All three Shuttle engines have been removed from Discovery in OPF Bay 3. Technicians in OPF Bay 3 are installing the wheels and tires on the main landing gear; reinstallation of the reinforced carbon carbon T-seals and panels on the leading edges of both wings; functional tests of the Orbiter's radiators; thermal protection system operations; leak and functional tests of the main propulsion system; testing of the communications system. Leak and functional tests of the main propulsion system helium system. [KSC SHUTTLE STATUS REPORT, 11 A.M., Oct. 24, 1991.]

OMS POD PREPARATIONS: ENDEAVOUR

Technicians in OPF Bay 1 are preparing to install the right orbital maneuvering system pod in the Space Shuttle Endeavour. Other processing activities in progress include: calibration of the three inertial measurement units; installation of the Ku-band antenna; leak and functional tests of the auxiliary power units; preparations to install the power reactant storage and distribution system tank set No. 3; preparations for an end-to-end test of the flight control system; tests of the main propulsion system; installation of strain gauges on the wings. Overnight, workers will be installing the right OMS pod and will install the left-hand pod this weekend. [KSC SHUTTLE STATUS REPORT, 11 A.M., Oct. 24, 1991.]

SPACELAB MODULE PROCESSING

Years of planning and several months of pre-launch processing and testing of flight hardware are nearing the final stages for Kennedy Space Center engineers and scientists working on the first International Microgravity Laboratory (IML-1) Spacelab module. Scheduled to be flown aboard the Orbiter Discovery in January 1992, IML-1 is the primary payload for the seven-day-long STS 42 Space Shuttle mission. IML-1 is now housed inside the cleanroom-like environment of the Operations and Checkout Building's highbay, but next month will be moved to bay 3 of the Orbiter Processing Facility where it will be installed inside the Shuttle Discovery's payload bay. Stowage of some experiments and further testing will continue on IML-1 once it's inside Discovery, but the majority of pre-launch work will be completed by the time it leaves the Operations and Checkout Building. "I've been associated with the IML-1 mission since 1989, and it's really nice to see the payload shaping up so well," remarked **Glenn Snyder**, KSC's STS 42 payload processing manager. "We've handled IML-1 in a careful, methodical fashion, and the product really exemplifies that. I think it's the cleanest and most trouble-free Spacelab we've ever processed." IML-1 is the first in a series of IML missions scheduled to be launched aboard the Shuttle during the next decade. All of these missions are dedicated to the study of life and materials sciences in microgravity. The missions will specifically concentrate on the intricate effects of weightlessness on living organisms and how materials react when mixed in space.

The IML program is a continuation of NASA's peaceful and successful multi-national space efforts. The venture is a combined partnership of NASA, the 14-nation European Space Agency (ESA), the Canadian Space Agency (CSA), the

French National Center for Space Studies (CNES), the German Space Agency and the German Aerospace Research Establishment (DARA/DLR), and the National Space Development Agency of Japan (NASDA). A seven-member astronaut flight crew is scheduled to fly aboard Discovery on the IML-1 Space Shuttle mission. The crew of the fourteenth flight of the Orbiter Discovery will consist of Commander **Ron Grabe**, Pilot **Steve Oswald**, Mission Specialists **Norman Thagard**, **David Hilmers** and **Bill Readdy** and Payload Specialists **Roberta Bondar** and **Ulf Merbold**. Bondar is a Canadian astronaut representing the Canadian Space Agency. Merbold represents the European Space Agency. [Varnes, NASA/KSC RELEASE NO. 120-91, Oct. 24, 1991.]

October 25: **ATLANTIS: PROPULSION TEST**

The Space Shuttle Atlantis is hard down at the pad and awaiting a critical test of its main propulsion system. KSC spokeswoman **Lisa Malone** said, "Things are going along pretty smoothly." At LC 39A, technicians are continuing fueling operations for STS 44. The pad will be closed to all but essential operations. A helium signature leak test begins tomorrow and concludes October 27; it involves pumping gaseous helium through the system to help detect leaks. The test is conducted before every mission. A successful hot firing of auxiliary power unit No. 1 was conducted last night. The service structure around Atlantis was rotated at 11:07 p.m. last night. At LC 39A, technicians today will continue preparations for fueling operations, a hazardous undertaking which requires clearing the pad area of all but essential personnel. A TCDT begins October 31 and concludes November 1. The Department of Defense Support Satellite will be loaded aboard Atlantis October 31. [Halvorson, FLORIDA TODAY, p. 5A, Oct. 26, 1991, KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 25, 1991, "Shuttle Atlantis Arrives On Pad for Nov. 19 Launch," THE ORLANDO SENTINEL, Oct. 25, 1991.]

DISCOVERY'S STS 42 PROCESSING

Engine No. 1 has been installed aboard Discovery and a functional test of the Orbiter's radiators has been completed in preparation for the vehicle's STS 42 mission. Work in progress includes: installation of the two remaining main engines; installation of the wheels and tires on the main gear; reinstallation of the reinforced carbon carbon T-seals and panels on the leading edges of both wings; thermal protection system operations; leak and functional tests of the main propulsion system and its helium system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 25, 1991.]

ENDEAVOUR: KU-BAND ANTENNA INSTALLED

Endeavour's Ku-band antenna has been installed while the vehicle is being processed in Orbiter Processing Facility Bay 1. Other current processing operations include: connections of the right orbital maneuvering system pod; leak and functional tests of the auxiliary power units; preparations to install the power reactant storage and distribution system tank set No. 3; preparations for an end-to-end test of the flight control system; tests of the main propulsion system.

Scheduled work includes: installation of the left orbital maneuvering system pod this weekend; tests of the flight controls planned for next week and installation of Endeavour's star tracker. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 25, 1991.]

[] **BUY SOVIET STATION?**

Two congressmen have inquired of NASA Administrator **Richard H. Truly** why the agency is not planning to buy the Soviet Mir Space Station. He replied, "The administration is intensely concerned about the health and capabilities of the U.S. aerospace industry," he said in a letter to the congressmen. "Depending on the specific case, procuring a Soviet system or technology in place of a procurement from U.S. industry may or may not be in the overall national interest." ["Lawmakers: Why Not Buy Soviet Station?" FLORIDA TODAY, p. 5A, Oct. 26, 1991.]

[] **3-DAY CONFERENCE TO FEATURE MCCARTNEY**

A three-day space conference set for Cocoa Beach, FL, entitled: "Logistics Outward Bound - The Earth, Moon and Mars," will offer discussions of the following topics: space transportation, financing, the space station, ground support operations, commercial space ventures, computer applications and future programs. Kennedy Space Center **Forrest S. McCartney** is expected to address the opening session November 4 at 8 a.m. at the Cocoa Beach Holiday Inn. Panelists include: **Richard Kohrs**, NASA's Space Station Freedom Director; **Michelle Griffin**, Associate Administrator for the Space Exploration Initiative, NASA; **Jack Lee**, Marshall Space Flight Center Director (Huntsville, AL); Maj. Gen. **Carl O'Berry**, Director of Command and Control Systems and Logistics at U.S. Space Command; **Kumar Krishen**, Johnson Space Center Chief Technologist, **Michael McCulley**, former Shuttle astronaut and Lockheed Launch Site Deputy Director; **Marcia Smith**, Space Policy Expert with Congressional Research Service. "Three-Day Conference to Attract Top Officials," FLORIDA TODAY, p. 9E, Oct. 27, 1991.]

October 28: **BUSH SIGNS SPACE STATION BILL**

President George Bush today signed a bill which allows NASA to proceed with the building of the Space Station Freedom; about $2 billion was provided in an $81 billion appropriation bill. Construction will start in the current fiscal year. ["Bush Signs Bill Providing Money for Space Station," FLORIDA TODAY, p. 2A, Oct. 29, 1991.]

[] **SIGNATURE LEAK TEST COMPLETE: ATLANTIS**

Technicians at Launch Complex 39A have completed cleaning up Atlantis' payload bay and launch pad validations; the Orbiter's helium signature leak test of the main engines and main propulsion system was also completed. In progress: Preparations for loading hypergolic propellants into the Orbiter's onboard storage tanks. In addition, hydrazine will be loaded into the Orbiter's auxiliary power units

and the boosters' hydraulic power units. The pad will be closed at 8 p.m. tonight through October 31 when this operation is scheduled to conclude. Closure of the payload bay doors for the hypergolic propellant loading activities are also underway. The STS 44 crew arrives at Kennedy Space Center tomorrow, October 30, at the Shuttle Landing Facility to participate in the Terminal Countdown Demonstration Test. On October 31, the Defense Support Program satellite will be loaded into Atlantis' cargo bay. The Terminal Countdown Demonstration Test begins October 31 and will be concluded the following day with a simulated launch. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 28, 1991.]

[] **DISCOVERY: T-SEALS INSTALLATION**

In OPF Bay 3, technicians are installing Discovery's T-seals on the leading edges of the Orbiter's wings. They are also installing the vehicle's water dump nozzle. Preparations are underway for a fuel cell single cell voltage test, the installation of the landing gear wheels and tires and servicing of the Orbiter's water spray boiler No. 3. Discovery's three main engines have been installed. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 28, 1991.]

[] **ENDEAVOUR: OMS POD INSTALLED**

The right orbital maneuvering system pod has been installed in the Space Shuttle Endeavour which is currently undergoing processing in OPF Bay 1 for its STS 49 mission. The right hand external tank door has also been attached to the Orbiter. Work in progress: electrical connections between the left orbital maneuvering system pod and the Orbiter; installation of the star trackers; installation of the power reactant storage and distribution system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 28, 1991.]

[] **GOODSON PAVING WINS NEW CONTRACT**

Goodson Paving Inc. (Sharpes, FL) has won a contract from NASA's Kennedy Space Center to pave several new roadways and parking lots. The fixed price contract is valued at $123,675 and covers all labor, equipment and materials for the three-stage project. Work is tentatively scheduled to begin next week and is expected to be completed within 120 calendar days. Construction will occur in three different phases. Task one consists of paving several new roadways and parking lots in the vicinity of the Rotation Processing and Surge Facility and the Crawler Maintenance Facility in the LC 39 area. A road lane extension will be added to existing lanes near Launch Complex 39A during the second phase of work. The final phase of paving will occur near the KSC Industrial Area with the construction of a 60-space parking lot to be used by employees working in the Contract Management Office and other contract facilities in the immediate area. [NASA/KSC News Release No. 123-91, Oct. 28, 1991.]

October 29: **ATLANTIS CREW ARRIVES AT KSC TODAY**

"We've got a big week coming up. I's been so quiet out here for so long, and

now it's finally picking up," said Kennedy Space Center spokeswoman **Lisa Malone**. The six-member crew of Atlantis' STS 44 mission is expected to arrive today at Kennedy Space Center at about 3:45 p.m. The crew which consists of Commander **Frederick D. Gregory**, Pilot **Terence "Tom" Henricks**, Payload Specialist **Thomas Hennen** and Mission Specialists **Mario Runco, F. Story Musgrave** and **James Voss**, will stay at KSC until November 1. At Launch Complex 39A, Atlantis' payload bay doors have been closed for the hypergolic propellant loading operations which are underway now. In addition, hydrazine will be loaded into the Orbiter's auxiliary power units and the boosters' hydraulic power units. The pad will be closed to all non-essential personnel through October 30 when the operation is expected to be concluded. [Halvorson, FLORIDA TODAY, p. 2A, Oct. 28, 1991, Banke, FLORIDA TODAY, p. 2A, Oct. 29, 1991, KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 29, 1991.]

DISCOVERY: VOLTAGE TEST COMPLETED

In Orbiter Processing Facility Bay 3, technicians have completed Discovery's fuel cell single cell voltage test and have installed the main landing gear wheels and tires. They also repositioned the aerosurfaces for thermal protection system operations. Technicians are working a variety of tasks: installation of T-seals on the leading edges of the wings; installation of the water dump nozzle; servicing of the water spray boilers; preparations for a hot oil flush of the auxiliary power units; preparations to install the Spacelab tunnel adapter; inspections of thermal control blankets in the payload bay. In the VAB next week, the external tank will be mated to the solid rocket boosters. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 29, 1991.]

STAR TRACKERS INSTALLED: ENDEAVOUR

Workers in OPF Bay 1 have installed the star trackers in the Space Shuttle Endeavour. Work in progress: electrical connections between the left orbital maneuvering system pod and the Orbiter; installation of a power reactant storage and distribution system oxygen tank; rigging of the right hand external tank umbilical door; preparation for a complete end-to-end test of the hydraulics system; elevon cove seal installation; preparations for a leak and functional test of the auxiliary power units. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 29, 1991.]

KSC IMPACT ON FLORIDA ECONOMY

Space-related employment and contracts at NASA's Kennedy Space Center generated a $1.416 billion boost to Florida's economy during the 1991 Fiscal Year which ended September 30. This represents an increase of about $100 million over the previous year. Of KSC's expenditures, $1,033 billion went to contractors operating on-site at the space center. An additional $224 million went off-site businesses in Brevard County. Other purchases and contracts awarded to Florida businesses outside of Brevard County totaled about $44 million. Space center purchases and contracts to businesses out of state totaled about $50 million.

However, at least 75 percent of the on-site and Brevard County expenditures were estimated to have stayed in the local area in the form of payrolls and purchases. Civil service salaries and personnel benefits through the end of FY91 amounted to $142 million, an increase of about $11 million over the previous year. About $117 million was for regular salary, lump-sum payments, overtime and awards programs. (The $25 million civil service benefits package and $50 million in out of state business awards increase KSC's total spending during the year to $1.493 billion.) Permanent federal employees at KSC edged over the 2,700 mark during the same period. While 3,450 individuals were employed through construction and tenant jobs at KSC, the majority of workers at KSC are employed by the on-site contractors and number almost 12,900. Overall, approximately 19,050 workers were employed at KSC through the close of the Fiscal Year on Sept. 30. Major contractors at KSC include Lockheed Space Operations, Co., the Shuttle Processing Contractor; EG&G Florida, Inc., the Base Operations Contractor; McDonnell-Douglas Space Systems, Inc., the Payload Ground Operations Contractor; and Rockwell International Corp., which provides Shuttle Orbiter logistics support. [NASA/KSC Release No. 126-91, Oct. 29, 1991.]

[] **COMPUTRAC CONTRACT: KSC**

NASA's John F. Kennedy Space Center has contracted CompuTrac (Titusville, FL), to supply computer hardware and integration services. The contract is valued at $91,209 and covers all materials, labor and equipment. CompuTrac will furnish 386/33 type computers and integrate 53 existing systems with government furnished equipment. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 29, 1991.]

[] **BARED AND COMPANY CONTRACT**

The Bared and Co. (Tampa, FL) has received a contract from NASA's John F. Kennedy Space Center to replace heating ventilating and air conditioning equipment. The fixed price contract is valued at $1,593,000 and covers all labor, equipment and materials necessary to replace heating and air systems in three buildings located at the Hypergol Maintenance Facility in KSC's Industrial Area. Work is tentatively scheduled to begin in early November and is expected to be completed in about a year. [NASA/KSC Release No. 124-91, Oct. 29, 1991.]

October 30: **STS 44 PAD PREPARATIONS**

Nitrogen tetroxide has been loaded into the storage tanks of the Space Shuttle Atlantis at Launch Complex 39A. The STS 44 crew arrived at Kennedy Space Center yesterday at 3:45 p.m. to take part in the Terminal Countdown Demonstration Test which will culminate at 11 a.m. October 31. The six-member crew includes: Commander **Frederick D. "Fred" Gregory**, Pilot **Terence T. "Tom" Henricks** Payload Specialist **Thomas Hennen** and Mission Specialists **F. Story Musgrave, Mario Runco Jr.** and **James S. Voss.** Commander Gregory and Pilot Henricks will practice landings in the Shuttle Training Aircraft tonight; the Defense Support Program satellite will be loaded into Atlantis' cargo bay. Monomethylhydrazine is being loaded into the Orbiter's onboard storage tanks.

Hydrazine will be loaded into the Orbiter's auxiliary power units and the boosters' hydraulic power units. The pad will be closed to all non-essential personnel until this afternoon at the conclusion of the fueling operation. There will be a hot firing of the right hand hydraulic power units later today and the entire crew is scheduled for emergency egress training and M113 driver training. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 30, 1991, Banke, FLORIDA TODAY, p. 2A, Oct. 29, 1991.]

[] STS 42 PROCESSING: DISCOVERY

The Space Shuttle Discovery is undergoing a number of processing tasks: checks of the hydraulic and flight control systems; servicing of the Orbiter with potable water; installation of T-seals on the leading edge of the wings; servicing of the water spray boilers; preparations for a hot oil flush of the auxiliary power units; preparations to install the Spacelab tunnel adapter; inspections of thermal control blankets in the payload bay. Next week, Discovery's external tank will be mated with its solid rocket boosters. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 30, 1991.]

[] STS 49 ENDEAVOUR PROCESSING

In Orbiter Processing Bay 1, the Space Shuttle Endeavour is having its power reactant storage and distribution system tank installed. Other tasks currently underway include: rigging of the right hand external tank umbilical door; preparation for a complete end-to-end test of the hydraulics system; elevon cove seal installation; preparations for a leak and functional test of the auxiliary power units. [KSC SHUTTLE STATUS REPORT, 10 A.M., Oct. 30, 1991.]

[] EUTELSAT LAUNCH DELAYED

A potential problem with its rocket's guidance system has again delayed the launch of Eutelsat, a European communications satellite from Cape Canaveral. The launch was delayed at least seven days. General Dynamics spokesman **Jim Codd** said, "Right now we're looking at either the 13th or 14th of November. We're taking one more look at a little flaky data we've gotten from the [rocket's] navigation unit," which was manufactured by Honeywell, Inc. Company investigators suspect that the problem was caused by a glitch in ground support equipment; if that should prove true the navigation unit will not have to be replaced. [Halvorson, FLORIDA TODAY, p. 8A, Oct. 31, 1991.]

October 31: NEW KSC DIRECTOR: CRIPPEN

NASA Administrator **Richard H. Truly** has named **Robert L. Crippen** to become the new Director of the John F. Kennedy Space Center, effective January 1, 1992. Crippen will replace **Forrest S. McCartney**, Lt. General, USAF, Retired, who will continue as Kennedy Director during a transition period until January 1, 1991. In announcing these moves, Truly said, "With 3 years of safe Shuttle flights behind us, Kennedy Space Center and the Shuttle program are moving into an era of new

challenges which will involve not only our continued commitment to safety, but also significant efforts to increase efficiencies and reduce operating costs. Bob Crippen has been a key leader over the years, and he will take the helm at Kennedy during the exciting years of continued Shuttle flights, leading to Space Station Freedom launch operations in the mid-1990's. Not only does Bob bring the personal experience of four space flights to the table, but his proven record of leadership in critical management assignments at both the Johnson and Kennedy centers, as well as his current job as Shuttle Program Director at NASA Headquarters, make him uniquely qualified at this critical time."

Truly also said, "The last several years, during which General McCartney has led Kennedy, have been genuinely remarkable ones for this vital launch center and for Forrest as well. In 1986, following the Challenger accident, I personally asked General McCartney, who at the time was nearing the conclusion of a long and distinguished career in the U. S. Air Force, to bring his experience to lead the safe return to flight at Kennedy. Since that first return flight in September 1988, the Kennedy team has launched 18 safe and successful flights in 3 years, with another on the pad at Launch Complex 39 for launch in just a few weeks. This is a remarkable record, achieved during the most challenging time in NASA's history, and the strength of Forrest's leadership in preparing the launch teams for the Shuttle's return to flight paved the way." [NASA/KSC NEWS RELEASE NO. 91-180, October 31, 1991, Halvorson, FLORIDA TODAY, p. 1A, Oct. 26, 1991, Banke, "KSC Chief: I Wanted to Stay Longer," FLORIDA TODAY, p. 1A, "KSC Director Expected to Be Replaced," THE ORLANDO SENTINEL, p. A16, Oct. 27, 1991, Nov. 2, 1991, Date, THE ORLANDO SENTINEL, p. A3, Oct. 30, 1991, Date, THE ORLANDO SENTINEL, p. A1 +, Nov. 1, 1991, Holton, THE ORLANDO SENTINEL, p. A4, Nov. 1, 1991.]

TCDT BEGINS AT LC 39A

At Launch Complex 39A, monomethylhdrazine has been loaded onto Atlantis' onboard storage tanks. Hydrazine was loaded into the Orbiter's auxiliary power units and the boosters' hydraulic power units. There was a successful hot firing of the right hand solid rocket booster (SRB) hydraulic power units. The STS 44 six-man crew has completed its M113 driver training. STS 44 managers are concerned that after the hot firing, hydraulic fluid was circulated in the hydraulic power unit to get any air out of the system prior to launch. The hydraulic power units are located in the aft skirt and generate power for the SRB hydraulic system. During the hot firing, a ground support pressure relief line was not hooked up to vent pressure and, consequently, it built up in the system causing a reservoir to rupture releasing some hydraulic fluid. Work is underway to replace the unit which is about two feet tall and a foot in diameter. Hydraulic fluid in the area is being cleaned up. The hydraulic pump, about the size of a lunch box and eight inches in diameter, also will be replaced. Spares for both parts are on site. An inspection is underway to determine whether any other components need to be replaced. Another hot firing is scheduled to retest the new components, but is not expected to impact the launch schedule. At the launch pad, technicians are installing the Defense Support Program satellite into the payload bay and have

begun the Terminal Countdown Demonstration Test. They are also expected to inspect the right hand solid rocket booster aft skirt. The flight crew will be briefed on the status of the vehicle and the payload and they will also receive training in the emergency egress procedures at LC 39A later today. The TCDT concludes November 1 at about 11 a.m.; a Flight Readiness Review is scheduled for November 7. [KSC SHUTTLE STATUS REPORT, 11 A.M., Oct. 31, 1991.]

DISCOVERY PROCESSING/OPF BAY 3

A number of tasks are underway in the Orbiter Processing Facility Bay 3 to ready the Space Shuttle Discovery for its STS 42 mission: brake anti-skid test; connections of fluid interfaces between the main propulsion system and main engines; checks of the hydraulic and flight control systems; servicing the Orbiter with potable water; installation of T-seals on the leading edges of the wings; servicing of the water spray boilers; a hot oil flush of the auxiliary power units; preparations to install the Spacelab tunnel adapter; inspections of the thermal control blankets in the payload bay. Next week, Discovery's external tank will be mated to its solid rocket boosters in the VAB. [KSC SHUTTLE STATUS REPORT, 11 A.M., Oct. 31, 1991.]

ENDEAVOUR PROCESSING/OPF BAY 1

Endeavour's payload bay doors have been closed for an end-to-end test in Orbiter Processing Facility Bay 1. The hydraulic system is undergoing an end-to-end test and the elevon cove seal is being installed. Scheduled work includes: further end-to-end testing through the weekend; checks of the orbital maneuvering system pods next week and leak and functional testing of the auxiliary power units. [KSC SHUTTLE STATUS REPORT, 11 A.M., Oct. 31, 1991.]

PAD ACCIDENT; NO DELAY

An accident at Launch Complex 39A "may eat two of the three days of slack time we have," said Kennedy Space Center spokesman **Mitch Varnes.** About 8 p.m. October 30, a hydraulic fluid storage tank in one of Atlantis' two solid rocket boosters ruptured, spilling about 2 1/2 gallons of hydraulic fluid. A new tank and hydraulic fluid pump will be installed this weekend at a cost of about $125,000. [Halvorson, FLORIDA TODAY, p. 4A, Nov. 1, 1991.]

NOVEMBER

November 1: CRIPPEN REPLACES MCCARTNEY AT KSC

Robert L. Crippen has been named the fifth Kennedy Space Center Director to succeed outgoing director **Forrest S. McCartney**, effective January 1, 1992. No replacement for Crippen as Shuttle Program Director has been announced by NASA; reportedly, NASA officials are considering combining the responsibilities of his job as program director with his new duties as head of KSC. This is seen as a first step in a major effort to consolidate Shuttle Program operations at the space center. Crippen is 54 years old and has been with NASA for 22 years; he piloted the first Shuttle mission, STS 1 and flew three other times aboard Space Shuttles before becoming Director of Space Shuttle Operations. [Banke and Halvorson, FLORIDA TODAY, pp. 1A-2A, Nov. 1, 1991; see entries for October 31, 1991, "McCartney Ends Years of Space Service," FLORIDA TODAY, p. 4A, Nov. 1, 1991, Banke, FLORIDA TODAY, Nov. 2, 1991, "Crippen Started Career As An Astronaut in 1969," FLORIDA TODAY, p. 4A, Nov. 1, 1991, Date, THE ORLANDO SENTINEL, Nov. 3, 1991, "McCartney Due Salute For His Service at KSC," FLORIDA TODAY, p. 8A, Nov. 4, 1991, "McCartney Due Salute for His Service at KSC," FLORIDA TODAY, Nov. 4, 1991.]

[] PRACTICE COUNTDOWN COMPLETED

"We had a real good [Terminal Countdown Demonstration Test]," said Kennedy Space Center spokeswoman **Lisa Malone** at the completion of the TCDT. "This is one of the major tests we do at the launch pad to get the Orbiter ready for launch." The six-member STS 44 crew of Commander **Frederick D. Gregory**, Pilot **Terence "Tom" Henricks**, Payload Specialist **Thomas Hennen** and Mission Specialists **F. Story Musgrave, Mario Runco** and **James Voss** participated in the closing hours of the test; they wore bright orange spacesuits and, except for Musgrave who is totally bald, all wore skull caps as a Halloween joke. At Launch Complex 39A, technicians completed the replacement of a tank and hydraulic fluid pump [see stories of late October] in Atlantis' right solid rocket booster. The unit will be tested tomorrow. Technicians also completed electrical connections between the vehicle and its Department of Defense cargo which was loaded October 31. [Halvorson, FLORIDA TODAY, p. 6A, Nov. 2, 1991, KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 1, 1991.]

[] STS 42 PREPARATIONS: DISCOVERY

In the Orbiter Processing Facility Bay 3, technicians have completed the Space Shuttle Discovery's brake anti-skid test, a hot oil flush of the auxiliary power units; checks of the hydraulic and flight control systems; check out of the nose wheel steering system. Tasks currently underway include: connections of fluid interfaces between the main propulsion system and main engines; servicing of the Orbiter with potable water; installation of T-seals on the leading edges of the wings; servicing of the water spray boilers; preparations to install the Spacelab tunnel adapter; inspections of thermal control blankets in the payload bay. Next

week, the external tank will be mated to the solid rocket boosters inside the Vehicle Assembly Building. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 1, 1991.]

STS 49: ENDEAVOUR PROCESSING

The newest Space Shuttle, Endeavour, is presently in OPF Bay 1 undergoing early preparations for the Orbiter's initial mission, STS 49. Work in progress includes: end-to-end testing of the hydraulic system; elevon cove seal installation; connections of the orbital maneuvering system pods to the Orbiter. Scheduled work includes: more end-to-end testing of the configuration of the Orbiter and its software; checks of the orbital maneuvering pods next week; leak and functional testing of the auxiliary power units next week. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 1, 1991.]

November 3:

FRR THIS WEEK AT KSC

NASA managers will hold its STS 44 Flight Readiness Review at Kennedy Space Center this week; a firm launch date will be set following the FRR. **Lisa Malone**, KSC spokeswoman, said "We'll be going over launch mission and landing details." If STS 44 launches on November 19, the landing at KSC should occur at 2 p.m. on November 29. At Launch Complex 39A this week, technicians will continue testing electrical connections between Atlantis and its cargo, a Defense Support Program satellite; two $10 million spacesuits will be packed in the Orbiter's airlock; ordnance devices will be installed. Managers are also meeting this week to decide when the newest Space Shuttle, Endeavour, will be ready to fly. "Like any crew that gets ready for a flight, we don't get particularly attached to any launch date," said **Dan Brandenstein**, Chief of NASA's Astronaut Corps. "And for a first flight of a vehicle, you're probably less attached." Endeavour is tentatively scheduled to launch on its STS 49 mission on April 9, 1992, but may be delayed from one to nine weeks. "Probably the answer is somewhere in the middle there," Brandenstein observed, "but generally everybody says it's too early to really pin down a good solid example of what the delay will be." The STS 49 mission will include the rescue of an Intelsat satellite. "We're still fine-tuning some of that, but the general concepts of everything we're planning to do are pretty well in place," continued Brandenstein. [Halvorson, FLORIDA TODAY, p. 1A, Nov. 3, 1991, Banke, FLORIDA TODAY, p. 10E, Nov. 3, 1991.]

ATLANTIS PASSES PUMP TEST

The Space Shuttle Atlantis passed a critical test today; the test involved running the hydraulic power unit of the Orbiter's right solid rocket booster to ensure that it is working properly. "The test gives us confidence that the equipment we've installed is going to work properly," said KSC spokeswoman **Lisa Malone**. The same test had been run earlier prior to a launch pad accident which necessitated a change-out of systems. Cost of the replaced components was placed at $125,000. [Halvorson, FLORIDA TODAY, p. 5A, Nov. 4, 1991.]

ATLANTIS: TCDT ENDED

At Launch Complex 39A, the Terminal Countdown Demonstration Test on the Space Shuttle Atlantis has been completed in anticipation of its STS 44 launch. Other completed activities include: hot fire and spin test of the newly installed hydraulic pump and reservoir on the right solid rocket booster; electrical connections of the right solid rocket booster reservoir and pump; calibration of the three inertial measurement units; purge tests of the main propulsion system; connections between the payload and the Orbiter and installation of the payload, the Defense Support Program satellite. Work in progress: tests of connections between the Orbiter and the payload bay began this morning; preparations are underway for the main engine flight readiness test for which sensors will be calibrated and valves will be cycled and tested. Scheduled work includes today's Launch Readiness Review; installation of the hypergolic propellant system for flight; Flight Readiness Review on November 7; installation of two contingency space suits into Atlantis' airlock. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 4, 1991.]

DISCOVERY: ET MATING TO SRBS

The Space Shuttle Discovery is undergoing a number of tasks in Orbiter Processing Facility Bay 3 in preparation for its STS 42 mission; these include: installation of auxiliary power unit No. 1; checks of the main engine electrical interfaces; servicing of the Orbiter with potable water; installation of T-seals on the leading edges of the wings; preparations to install the Spacelab tunnel adapter; inspections of thermal control blankets in the payload bay. In the VAB, mating is underway of the external tank to the solid rocket boosters. A functional test of Discovery's galley has been scheduled. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 4, 1991.]

ENDEAVOUR: END-TO-END TESTING COMPLETED

In Orbiter Processing Facility Bay 1, end-to-end testing of Endeavour's hydraulics systems has been completed and a leak and functional test of the auxiliary power units has been scheduled for this week. Currently, technicians are: testing the orbital maneuvering system pods; installing the elevon cove seal; opening the payload bay doors; installing an oxygen tank for the power reactant storage and distribution system; working on thermal protection system operations and thermal blanket work around the star tracker doors. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 4, 1991.]

November 4:

ATLANTIS: LRR COMPLETED

At the conclusion of today's Launch Readiness Review, NASA managers said that they saw no reason why Atlantis should not be launched November 19. "All KSC elements are ready to support the last flight of the year. We don't have any major concerns or issues at this time in the processing operation. We are in good shape, " said **Jay Honeycutt**, Director of Space Transportation System

Management and Operation at KSC. A firm launch date will not be set until the November 7 Flight Readiness Review. [Halvorson, FLORIDA TODAY, p. 7A, Nov. 5, 1991, "STS-44 Launch Readiness Review Statement," NASA/KSC Release, dated Nov. 4, 1991.]

November 5: **EUTELSAT LAUNCH DELAYS**

"I think it is reasonably safe to say we'll launch [the Eutelsat 2 spacecraft] late this year or early next year," said **Ben Wier**, Vice President and Director of General Dynamics Corp.'s Atlas Program today. That may not work out because the launch is being delayed for the fourth time to replace the navigation unit that guides the Atlas Launch Vehicle. The late launching of the Eutelsat 2 spacecraft, a communications satellite, may interfere with the broadcast in Europe of the 1992 Winter Olympics. Eutelsat 2 Program Manager **Jean-Jacques Dumesmil** said, "It's clear that it's getting pretty close." Recent tests by Honeywell Inc. revealed faulty transistors. The launch will now be delayed until late December or early 1992. [Halvorson, FLORIDA TODAY, p. 2A, Nov. 6, 1991.]

ATLANTIS ON SCHEDULE FOR LAUNCH

"We seem to be passing all of our milestones at the launch pad without problems. Things are looking good for maintaining our target launch date [Nov. 19]," according to Kennedy Space Center spokeswoman **Lisa Malone**. Tests of the electrical and mechanical connections between the Orbiter and the payload are complete, said Malone. Ordnance devices have not yet been installed. A main engine flight readiness test was completed this morning; the sensors were calibrated and valves were cycled and tested. No concerns or issues were raised at yesterday's Launch Readiness Review. The aerosurfaces of Atlantis are being cycled; technicians are closing out the solid rocket booster thermal curtains. Tomorrow [November 6] technicians will conduct payload end-to-end tests, install ordnance devices, pressurize the hypergolic propellant system for flight and install two contingency space suits in the airlock. A Flight Readiness Review is scheduled for November 7. [Halvorson, FLORIDA TODAY, p. 2A, Nov. 6, 1991, KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 5, 1991.]

DISCOVERY PROCESSING FOR STS 42

Discovery's external tank was mated to the twin solid rocket boosters at 11:25 p.m. last night [November 4]. Workers in the Orbiter Processing Facility Bay 2 are preparing to install the Spacelab tunnel adapter and for functional testing of the orbital maneuvering system pods and forward reaction control system. Thermal protection system operations are underway on all areas of the vehicle. Workers are installing auxiliary power unit No. 1, checking the main engine electrical interfaces and servicing the Orbiter with potable water. A functional test of the vehicle's galley is scheduled. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 5, 1991.]

INTELSAT REBOOST MISSION: ENDEAVOUR

Workers in Orbiter Processing Facility Bay 1 have opened the payload bay doors of Endeavour. Leak and functional tests of the newest Orbiter's auxiliary power units are scheduled for this week. Work in progress: electrical testing of the orbital maneuvering system pods; elevon cove seal installation; installation of an oxygen tank for the power reactant storage and distribution system; thermal protection system operations; thermal blanket work around the star tracker doors; checkout of the main propulsion system; welding lines in the gaseous oxygen system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 5, 1991.]

November 6: **STS 44: AEROSURFACES CYCLED**

Technicians at Launch Complex 39A have cycled the aerosurfaces of the Space Shuttle Atlantis in preparation for its STS 44 mission targeted for November 19. Pad workers are continuing payload end-to-end testing, preparations for ordnance operations, closing out of the solid rocket booster thermal curtains and aft closeouts. Work scheduled: installation of ordnance devices on the vehicle at midnight tonight, pressurization of the hypergolic propellant system for flight, flight readiness review and installation of two contingency space suits into the airlock on November 8. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 6, 1991.]

STS 42/IML-1: DISCOVERY

Workers in Orbiter Processing Facility Bay 3 are installing the Spacelab tunnel adapter in the Space Shuttle Discovery and testing the orbital maneuvering system pods and the forward reaction control system. They are also testing the power reactant storage and distribution system and conducting thermal protection system operations on all areas of the vehicle. Closeouts of auxiliary power unit No. 1, checks of the main engine electrical interfaces and servicing of the Orbiter with potable water are continuing as well. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 6, 1991.]

ENDEAVOUR PROCESSING FOR STS 49

In the Orbiter Processing Facility Bay 1, processing personnel have installed the oxygen tank for the power reaction storage and distribution system in the Space Shuttle Endeavour; they also deployed the Ku-band antenna. Work in progress: electrical testing of the orbital maneuvering system pods; elevon cove seal installation; thermal protection system operations; checkout of the main propulsion system; welding lines in the gaseous oxygen system; preparations for leak and functional tests of the auxiliary power units. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 6, 1991.]

November 7: **STS 44: NOVEMBER 19 LAUNCH**

At the conclusion of today's Flight Readiness Review at NASA's Kennedy Space Center, FL, Shuttle and payload managers have targeted November 19 as the

official launch date for mission STS 44 aboard the Space Shuttle Atlantis. "Everything at the pad is fine. The managers feel comfortable that we can target the 19th for the launch and make that date," said KSC spokesman **Bruce Buckingham**. The 2 1/2-hour launch window for this ninth Department of Defense flight opens after dark at 6:51 p.m., EST, on the 19th; it will mark the seventh nighttime launch. A full load of military and scientific experiments will be carried out during the upcoming 10-day mission; of primary importance will be the deployment of the latest in a series of Defense Support Program reconnaissance satellites. Two of Atlantis' crew members are space veterans: Commander **Fred Gregory** will be making his third Shuttle flight; Mission Specialist **Story Musgrave** will be making his fourth. The four remaining crew members will be ventured into space for the first time: Pilot **Tom Henricks**, Mission Specialists **Jim Voss** and **Mario Runco**, and Payload Specialist **Tom Hennen**. STS 44 represents the 44th Space Shuttle mission and the tenth flight for Atlantis. A three-day countdown begins at 12:01 a.m. on November 17. Landing is scheduled for 2:27 p.m. on the Shuttle Landing Facility on November 29. Part one of ordnance installation has been completed. work in progress includes: aft compartment closeouts; auxiliary power unit #1 heater/thermostat tests; air vent cleaning and sampling; installation of contingency space suits into airlock; payload/IUS flight readiness checks; external tank purge preparations. Hypergolic fuel system pressurization and launch countdown preparations remain scheduled. [NASA/KSC Release, Nov. 7, 1991, Halvorson, FLORIDA TODAY, p. 1A, Nov. 8, 1991, KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 8, 1991, Date, THE ORLANDO SENTINEL, Nov. 8, 1991.]

GRUMMAN/THIOKOL WIN LOW TROPHY

Grumman Technical Services Division (Titusville, FL) and Thiokol Corp., Space Operations (Brigham City, UT) have been named recipients of the 1991 George M. Low Trophy - NASA's Quality and Excellence Award. NASA Administrator **Richard H. Truly** announced the selection last night of the Eighth Annual NASA/Contractors Conference and Symposium (Houston, TX). "The George M. Low Trophy recognizes the best of the best of contractors who work on the space program. The management and employees of Grumman and Thiokol deserve this recognition. These firms have shown exceptional performance. Their achievements serve as examples which others can pattern themselves after," said Truly. Grumman Technical Services Division provides hardware and support services to the integrated launch team at the Kennedy Space Center, FL. Thiokol Corp., provides the redesigned solid rocket motor propulsion system which produces 80 percent of the thrust necessary for Space Shuttle liftoff. In addition, Thiokol provides engineering services for sounding rocket design for NASA's Goddard Space Flight Center (Greenbelt, MD). The Low Trophy recognizes NASA's prime contractors, subcontractors and suppliers for outstanding achievements in quality and productivity improvement and total quality management (TQM). Key goals of the award are to internalize quality and productivity practices and TQM processes throughout NASA and the agency's contractors.

The other finalists for the 1991 award were:

*EG&G Florida, Inc. (Kennedy Space Center, FL).

*Honeywell, Inc., Space and Strategic Systems Operations (Clearwater, FL).

*Computer Sciences Corp., Applied Technology Division (Falls, WI).

*Cray Research, Inc., Manufacturing Division (Chippewa Falls, WI).

*TRW Space and Technology Group (Redondo Beach, CA).

*Unisys Space Systems Division (Houston, TX).

Award criteria, developed by NASA in conjunction with the American Society for Quality Control (Milwaukee, WI) were used to judge nominees on performance achievements and improvements in customer satisfaction, quality and productivity levels. Emphasis was placed on management commitment, goals and measures, communication, health and safety, work force training, award recognition and subcontractor involvement. "These firms have demonstrated admirable performance and have earned the right to be considered among the very best in meeting the award criteria," said George A. Rodney, NASA Associate Administrator for Safety and Mission Quality. [NASA/KSC Release NO. 91-185, Nov. 7, 1991, Halvorson, FLORIDA TODAY, p. 9E, Nov. 10, 1991.]

[] DISCOVERY: TUNNEL ADAPTER INSTALLED

Workers in OPF Bay 3 have completed the installation of the Spacelab tunnel adapter in Discovery. Technicians are hooking up auxiliary power unit number 1 and conducting payload integrated verification tests. Scheduled work includes: cabin and tunnel adapter leak checks, external tank disconnect door functional tests and auxiliary power unit closeouts and retests. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 7, 1991.]

[] ENDEAVOUR'S PROCESSING PROGRESS

Technicians in OPF Bay 1 are conducting: thermal protection system operations; preparations for auxiliary power unit leak and functional tests; orbital maneuvering system pod electrical tests; auxiliary power unit lube oil servicing and main propulsion system leak checks. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 7, 1991.]

November 8: ENDEAVOUR WEEKS BEHIND SCHEDULE

"I don't think there's any need to change the schedule," said KSC Director **Forrest S. McCartney**, concerning the processing of the Space Shuttle Endeavour in OPF High Bay 1. "The situation remains one of lots of work, and we're a few weeks behind. We're going to keep working it the same way we treat the other birds.

I don't want Endeavour to be different." Officials confirmed that the newest Space Shuttle is as much as six weeks behind schedule. Endeavour's STS 49 mission is unofficially targeted for April 9, 1992; the target date remained unchanged following a three-hour briefing for Shuttle Program Director **Robert L. Crippen.** Today technicians loaded two spacesuits into Atlantis' airlock; they would be used if an emergency extravehicular activity (EVA) was needed. Launch of Atlantis is set for between 6:51 p.m. and 9:21 p.m. on November 19, with a landing at Kennedy Space Center ten days later. [Banke and Halvorson, FLORIDA TODAY, p. 6A, Nov. 9, 1991.]

[] **STS 42: DISCOVERY PROCESSING**

The Spacelab tunnel adapter having been installed in Discovery, cabin and tunnel adapter leak checks have been scheduled; also scheduled are external tank disconnect door functional tests and auxiliary power unit closeouts and retests. Work in progress includes: hooking up auxiliary power unit number one; payload integrated verification tests; potable water servicing. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 8, 1991.]

[] **ENDEAVOUR PROCESSING: STS 49**

Lagging some six weeks behind in its processing schedule, the technicians working on the Space Shuttle Endeavour are engaged in a number of activities: thermal protection system operations; removal of a main propulsion system helium tank and leak checks; preparations for auxiliary power unit leak and functional tests and APU servicing; orbital maneuvering system pod electrical tests. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 8, 1991.]

November 12: ATLANTIS: EXTERNAL TANK PURGED

Launch Complex 39A workers have completed a purge of Atlantis' external tank are now purging the power reactant storage and Distribution System. A simulated countdown test for the Inertial Upper Stage is underway as are preparations for final ordnance operations; closing out the solid rocket boosters and aft closeouts. Scheduled work includes: installation of flight doors on the aft compartment tomorrow; final ordnance operations November 13; closure of the payload bay doors for flight on November 16; arrival of the STS 44 flight crew at 6:30 p.m. EST November 16. The launch countdown begins at 12:01 a.m. EST November 17 and launch on November 19 at 6:51 p.m. EST. [KSC SHUTTLE STATUS REPORT, 11 A.M., Nov. 12, 1991.]

[] **DISCOVERY: ET DOORS TESTED**

Technicians in OPF Bay 3 have completed a functional test of the external tank doors on Discovery. Work in progress includes: testing of the orbital maneuvering system pods and the forward reaction control system; testing of the power reactant storage and distribution system; thermal protection system operations; testing of the auxiliary power units; checks of the main engine

electrical interfaces; servicing the Orbiter with potable water; installation of heat shields around the main engine. Workers are scheduled to service Discovery's ammonia boiler. [KSC SHUTTLE STATUS REPORT, 11 A.M., Nov. 12, 1991.]

[] ENDEAVOUR: OMS PODS TESTING

Work in progress in the processing of Endeavour includes: electrical testing of the orbital maneuvering system pods; elevon cove seal installation; thermal protection system operations; checkout of the main propulsion system; welding lines in the gaseous oxygen system; leak and functional tests of the auxiliary power units; testing of the electrical interfaces in the power reactant storage and distribution system; Ku-band systems test; environmental control system testing. [KSC SHUTTLE STATUS REPORT, 11 A.M., Nov. 12, 1991.]

November 12: ESMC NOW 45TH SPACE WING

The Eastern Space and Missile Center is now officially the 45th Space Wing and includes the following elements: 45th Operations Group, 45th Space Support Group, 45th Logistics Group and 45th Medical Group, which will operate the Patrick Air Force Base Hospital. "This is not just some new experiment," said Lt. Gen. **Thomas Moorman**, commander of the Air Force Space Command, who presided at the name change ceremony at Patrick AFB. "It's a proven organizational structure we're confident will be effective as the Air Force, by necessity, becomes leaner, more efficient and more focused on its operational mission." [Banke, FLORIDA TODAY, p. 1B, Nov. 13, 1991.]

November 13: AFT COMPARTMENT CLOSED OUT

Another technical milestone on the way to launching Atlantis was passed today when technicians closed the Shuttle's rear engine compartment. "We're all looking forward to launch next week," said Kennedy Space Center spokeswoman **Lisa Malone**. "The team is ready to go and we don't have any problems with the Shuttle." STS 44 is scheduled to launch at 6:51 p.m. November 19, 1991. [Banke, FLORIDA TODAY, p. 5A, Nov. 13, 1991.]

[] ATLANTIS: PRE-LAUNCH PROCESSING

Technicians readying Atlantis at LC 39A for the STS 44 mission have purged the power reactant storage and distribution system; simulated countdown test for the Inertial Upper Stage; closed out the solid rocket boosters; doors were installed on the aft compartment at 10 p.m. last night. "We're in good shape," said KSC spokeswoman **Lisa Malone**. "We're not tracking any problems that would prevent us from getting airborne next Tuesday." Work in progress includes: preparations for final ordnance operations, i.e., clearing the pad at midnight tonight through tomorrow afternoon for this hazardous activity; payload closeouts and evaluation of data from yesterday's Inertial Upper Stage simulated countdown; disconnecting ground support quick disconnects from the Orbiter's hypergolic propellant system; lowering booster service platforms from the launch platform; launch countdown

preparations; installation of the crew escape pole in the crew cabin. Scheduled work includes: closure of the payload bay doors for flight on Saturday (November 16); the flight crew arrives at KSC 6:30 p.m. EST November 16; the launch countdown begins at 12:01 a.m. EST, November 17; Launch is set for 6:51 p.m. EST, November 19. [KSC SHUTTLE STATUS REPORT, 11 A..M., Nov. 13, 1991, Banke, FLORIDA TODAY, p. 2A, Nov. 14, 1991.]

OPF BAY 3: DISCOVERY PROCESSING

In Orbiter Processing Facility Bay 3, technicians have installed the Spacelab tunnel extension and are slated to service the Orbiter's ammonia boiler. Work in progress on Discovery includes: preparations to install the payload laboratory; testing of the orbital maneuvering system pods and the forward reaction control system; testing of the power reactant storage and distribution system; thermal protection system operations; testing of the auxiliary power units; checks of the main engine electrical interfaces; servicing of the Orbiter with potable water; installation of heat shields around the main engines. [KSC SHUTTLE STATUS REPORT, 11 A..M., Nov. 13, 1991.]

ENDEAVOUR: OMS PODS TESTING

Technicians are currently testing the orbital maneuvering system pods of Endeavour in OPF Bay 1 in preparation for its STS 49 mission next April. Other current activities include: elevon cove seal installation; thermal protection system operations; checkout of the main propulsion system; leak and functional tests of the auxiliary power units; testing of the electrical interfaces in the power reactant storage and distribution system; Ku-band antennas; environmental control system testing. Scheduled work includes: installation of the robot arm this week and installation of the three Shuttle main engines next week. [KSC SHUTTLE STATUS REPORT, 11 A..M., Nov. 13, 1991.]

ATLAS-1 PAYLOAD

A major milestone in the pre-launch processing of NASA's Atmospheric Laboratory for Applications and Sciences (ATLAS-1) was achieved at the Kennedy Space Center this week when the future Space Shuttle payload passed its Spacelab systems test. The horizontal payload's passing of this thorough electrical, mechanical and fluid systems checkout is a crucial step in preparing ATLAS-1 for its flight aboard the Orbiter Atlantis on STS 45, now slated for launch next spring. ATLAS-1 is now in the midst of an interface verification test that checks the integrity and readiness of all the payload's flight experiments. ATLAS-1 is the second Shuttle payload dedicated to NASA's Mission to Planet Earth. The first such payload was the ozone-studying Upper Atmosphere Research Satellite (UARS), which was successfully deployed from the Orbiter Discovery this past September. However, unlike UARS, ATLAS-1 will remain inside Atlantis' payload bay throughout the mission. From an altitude of 300 kilometers (160 nautical miles) and with a 57 degree orbital inclination to the equator, ATLAS-1 will be in

an excellent vantage point to observe Earth's atmosphere, the sun and other astronomical targets.

The experiments aboard ATLAS-1 will specifically investigate how Earth's atmosphere and climate are affected by the sun and by the products of industrial facilities and agricultural activities occurring around our planet. The experiments will also study the chemical composition of the atmosphere between 15 and 600 kilometers (8 to 330 miles) above the Earth's surface and measure the energy contained in sunlight. Studies will also be undertaken to examine the universe's sources of ultraviolet light and to determine how the planet's electric and magnetic fields and atmosphere influence each other. "We just wrapped up one of the most intensive pre-flight tests that we put Spacelab payloads through," remarked **Mike Kinnan**, KSC's ATLAS-1 payload manager. "We had some minor problems at times, but the test is done to catch these problems prior to flight. We've got an aggressive and talented processing team working on ATLAS-1, and I don't see any concerns with meeting the remaining milestones in our pre-launch processing schedule." A seven-member astronaut crew is scheduled to fly aboard Atlantis on the STS 45/ATLAS-1 mission. The eleventh flight of Atlantis will consist of Commander **Charles F. Bolden**, Pilot **Brian Duffy**, Mission Specialists **Kathryn D. Sullivan**, **C. Michael Foale** and **David C. Leestma** and Payload Specialists **Byron K. Lichtenberg** and **Dirk D. Frimout**. ATLAS-1 is the first of ten planned ATLAS missions, which will gather data over an 11-year solar cycle. [NASA/KSC News Release No. 131-91, Nov. 13, 1991.]

PROCUREMENT BRIEFING PLANNED

Kennedy Space Center will host the 8th Annual Procurement Briefing to Industry beginning at 10:30 a.m. on Friday, November 15, 1991, at Spaceport USA's Galaxy Theater. Over the past several years, the annual procurement briefing has been a strong and effective part of KSC's aggressive outreach effort. It is one of the key components of the Space Center's commitment to continually increase competition and provide private industry with the maximum opportunity to do business at KSC. During past briefings, over 450 companies have been represented. This briefing, like those of past years, is a tool for business of all sizes to use to identify procurement opportunities at KSC. At 9:00 a.m. that morning prior to the briefing, KSC will host the Annual Small Business Awards Ceremony. During the ceremony small businesses in several categories will be recognized for their outstanding achievements at KSC during fiscal year 1991.
In addition to the briefing, the NASA-KSC Small and Small Disadvantaged Business Council will sponsor an expo for small businesses. "Small Business Expo '91" will be held at the U.S. Space Camp Facility (Titusville, FL) on Thursday, November 14, 1991, with events commencing at 9:00 a.m. KSC Center Director **Forrest S. McCartney** will take part in a ribbon cutting ceremony. Approximately 150 small and small disadvantaged businesses are expected to display their products and discuss their special capabilities. The expo is free and open to the public. Following the Small Business Expo will be a Small Business Opportunities Forum and Reception hosted by the Brevard Small Business Assistance Council; a reception will be held at the Cocoa Beach Hilton (November 14) at 6:00 p.m.

Featured speaker at the forum will be **Gayle Sayers**, former NFL football star and current President of Crest Computer Supply (Skokie, IL). Also, a panel of Small Business Specialists will be available late that evening to discuss procurement strategies for doing business with government agencies and large prime contractors. [NASA/KSC Release No. 129-91, Nov. 13, 1991, Grainick, FLORIDA TODAY, pp. 18C & 17C, Nov. 15, 1991.]

November 14: **LAUNCH COMPLEX 39A: ATLANTIS**

Pad workers at Launch Complex 39A have lowered booster service platforms from the launch platform where Atlantis awaits the start of its STS 44 mission. They have also installed the crew escape pole; successfully retested the Inertial Upper Stage's redundant inertial measurement unit. Final ordnance operations including checks of the firing circuits are underway; the pad is cleared until this afternoon for this hazardous activity. Launch countdown preparations continue as do payload closeouts. Work scheduled: payload flight readiness checks tomorrow; closure of the payload bay doors for flight on Saturday (November 16); the flight crew arrives at KSC at 6:30 p.m. EST on the 16th; the launch countdown begins at 12:01 a.m. EST November 17; launch is set for 6:51 p.m. EST November 19. Weather conditions expected for launch day: an upper level trough of low pressure in the western Gulf of Mexico will create some general instability. At the surface, a cold front will extend from the central Gulf through Western Florida. High pressure will be located in the Atlantic. Cloud thickness and possible ceilings below 8,000 feet are the concerns. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 14, 1991, L-5 Day Weather Outlook for STS 44, Nov. 14, 1991.]

[] **DISCOVERY: ORBITER PROCESSING**

In Orbiter Processing Facility Bay 3, technicians are engaged in a variety of processing activities: preparations to install the payload laboratory; cleaning of the payload bay; testing of the orbital maneuvering system pods and the forward reaction control system; thermal protection system operations; testing of the auxiliary power units; checks of the main engine systems; servicing of the Orbiter with potable water; installation of heat shields around the main engines. Work scheduled includes: servicing of the ammonia boiler; installation of the International Microgravity Laboratory-1 on November 17. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 14, 1991.]

[] **ENDEAVOUR: ROBOT ARM INSTALLATION**

The robot arm (or remote manipulator system) is being installed in the Space Shuttle Endeavour in OPF Bay 1. Technicians are also: testing the orbital maneuvering system pods; elevon cove seal installation; thermal protection system operations; checkout of the main propulsion system; leak and functional tests of the auxiliary power units; testing of the electrical interfaces in the power reactant storage and distribution system; Ku-band systems test; environmental control system testing. Endeavour's three main engines will be installed next week. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 14, 1991.]

TRULY RELEASES NASA STUDY

NASA Administrator **Richard H. Truly** today released an internal agency report on roles and responsibilities of NASA centers and Headquarters offices, fulfilling a pledge "to move out aggressively across the board" on the recommendations by the Advisory Committee on the Future of the U.S. Space Program. Truly directed former Deputy Administrator **James R. Thompson** to undertake this assessment in late 1990. It represents the first comprehensive look at NASA roles and responsibilities in over 10 years. "J. R. submitted his plan to me on Friday (November 8) and I think he deserves a lot of credit for the outstanding analysis of the agency he has performed," Truly said. "I intend to give these recommendations careful consideration as we continue to make NASA an even better agency." Thompson's report focuses on three main thrusts: building on NASA field organizations as Centers of Excellence in specific areas of science, technology and development; a reminder to "stick to basics" in engineering disciplines and program management and realignment of certain NASA Headquarters office responsibilities (within the context of recent organizational changes) to achieve more effective program execution. Truly has recently instituted aggressive changes in NASA's management and organization as the agency positions itself to most effectively execute America's space program in the coming decades.

The Thompson plan would have a dramatic effect upon Kennedy Space Center and Brevard County. The report calls for about 100 top Shuttle Program managers to relocate to KSC, which would become the lead NASA field center for the Shuttle Program, replacing Johnson Space Center in that position. "One hundred executive positions will have a very positive economic impact. It will stimulate the creation of an equal number of jobs in other areas, such as real estate and retail," said **Lawrence Wuensch**, President of the Brevard Economic Development Corp. "The economy needs some good news. It could use a boost." The plan also calls for the Shuttle Project Managers at JSC and Marshall Space Flight Center to be moved to KSC to consolidate Shuttle operations at the launch site. The first part of the move could take as much as a year to implement and more workers might follow the first 100. Thompson's recommendations will be discussed December 9-10 at a NASA meeting with Truly, headquarters officials, center directors and their deputies. [NASA/KSC News Release No. 91-190, Nov. 14, 1991.]

ELECTRONICS BOX PROBLEM: NO DELAY

A malfunctioning circuit in an electronics box will not delay the launch of Atlantis on its STS 44 mission November 19. The electronics box is used to relay information about the performance of a Shuttle rocket booster steering system to the Orbiter's computers and ground controllers. The circuit's faulty performance was detected in a test November 13. The Shuttle's computers get the same information from three other sources, so managers are not calling the problem a threat to launch. Workers are continuing with their usual prelaunch preparations at Launch Complex 39A; they are completing work on Atlantis' 15-story external

tank and its SRBs. No other technical problems exist to date; KSC Launch Director **Robert B. Sieck** said, "We still have a few days to go." Air Force meteorologists are predicting a 50% chance of favorable weather for launch November 19. They are primarily concerned about a chance of scattered showers and thunderstorms in the KSC area. [Banke, FLORIDA TODAY, p. 4A, Nov. 15, 1991.]

November 15: **ORDNANCE INSTALLED**

Final ordnance operations including checks of the firing circuits have been completed at Launch Complex 39A in preparation for launch of STS 44 on November 19. Technicians were also able to resolve a measurement for a hydraulic actuator on the right booster and closed out the booster forward skirts and the external tank intertank for launch. As launch countdown preparations continue at the pad, non-flight items such as protective covers from the reaction control system thrusters are being removed; flight crew equipment has been stowed in the crew cabin and platforms have been removed from the crew cabin; the hazardous gas detection system has been verified at the pad and payload closeouts are continuing. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 15, 1991.]

[] **DISCOVERY: PAYLOAD BAY CLEANING**

In Orbiter Processing Facility Bay 3, technicians are cleaning Discovery's payload bay in preparation for installing the payload laboratory (IML-1); leak and functional tests of the waste containment system are continuing and the ammonia boiler is being serviced. Other work in progress: testing of the orbital maneuvering system pods and the forward reaction control system; thermal protection system operations; checks of the main engine systems; installation of heat shields around the main engines. The International Microgravity Laboratory-1 will be installed on November 17. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 15, 1991.]

[] **ENDEAVOUR: ROBOT ARM INSTALLED**

Workers in Orbiter Processing Facility Bay 1 have installed a robot arm in Endeavour; they have also completed leak checks of the elevon cove seals. Work in progress: preparations to check out the robot arm; testing of the orbital maneuvering system pods; thermal protection system operations; checkout of the main propulsion system; leak and functional tests of the auxiliary power units; testing of the electrical interfaces in the power reactant storage and distribution system; Ku-band systems test; environmental control system testing. Workers will begin to install Endeavour's three main engines on November 18. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 15, 1991.]

[] **CONSOLIDATION MAY COST JOBS AT KSC**

"I think you'll see some people moving to KSC, and I also think it'll give us an opportunity for some overall reductions in what it takes [at KSC]" to prepare

Shuttles for launch, according to former Deputy Administrator **J. R. Thompson**. He declined to estimate the number of jobs that might be lost. "It depends on how it's done and how it's phased in." "After the Challenger accident," Thompson continued, "we put a lot of eyes on all the hardware. We tried to make everybody a part of it. At that time we just wanted to get back flying again. I think it was right at the time. But now, looking for the long haul, I think we can streamline the way we operate it and be safer, more efficient and less costly." NASA is considering Thompson's recommended plan to move some 100 engineers and program managers to KSC from centers in Texas and Alabama. The idea was first proposed by a presidential commission and is now suggested by Thompson. [Banke, FLORIDA TODAY, p. 7A, Nov. 16, 1991, "Bring Shuttle Bosses Home to Launch Site," editorial, FLORIDA TODAY, p. 12A, Nov. 21, 1991.]

[] **STS 44 CREW ARRIVES TODAY**

"The whole team is primed for launch and there are no big issues on the horizon," according to Kennedy Space Center spokeswoman **Lisa Malone**; the STS 44 crew is due to arrive today at 6:30 p.m. to begin three days of briefings and final mission preparations. **Gregory** and **Henricks** will practice landings in the Shuttle Training Aircraft on the Shuttle Landing Facility. Workers at LC 39A are filling propellant storage tanks, testing electrical and communications systems and watching the weather which offers a 60% chance of liftoff on November 19. [Banke, "Atlantis Crew Arrives Today," FLORIDA TODAY, p. 7A, Nov. 16, 1991.]

November 16: **STS 44 CREW ARRIVES**

"It's good to come down here as the Cape is finishing up their work so we can start our work," said STS 44 Pilot **Tom Henricks** on arrival at Kennedy Space Center with his five crew mates: Commander **Fred Gregory**, Payload Specialist **Thomas Hennen** and Mission Specialists **James Voss**, **Mario Runco** and **Story Musgrave**. "We should have a great time up there," added Commander Gregory. "We have a great crew. We've been training for about a year and I think at this point we're fully prepared to go and not only accomplish all the mission, but enjoy ourselves at the same time." Musgrave will be making his fourth Shuttle flight. He said, "I'm the chief cook and bottle-washer on this flight, which is one of the more rewarding tasks." The payload doors were closed on Atlantis for the final time before launch. Lt. Col. **John Traxler**, the Air Force manager in charge of preparing the Defense Support Program satellite for launch, said, "It was really a joy to watch the doors close. There was an enthusiastic payload launch team out there." **Al Sofge**, NASA Shuttle Test Director, said that everything was on schedule and that there were no major technical problems. [Banke, FLORIDA TODAY, p. 5A, Nov. 17, 1991.]

[] **STS 44 WILL LAND AT KSC**

"I'm sure you've heard that there are hazards associated with landing in Florida versus California, but we think we can control those by taking a close look at the weather forecast," said Atlantis Pilot **Tom Henricks** after his arrival at KSC. He

noted one benefit of landing in Florida over California: "If we do land in Florida it reduces the risk associated with transporting the vehicle across the country." [Halvorson, FLORIDA TODAY, p. 10E, Nov. 17, 1991.]

November 17: **STS 44: L-2 DAYS**

"At this point everything looks squeaky clean, and we hope it continues that way," according to **Eric Redding**, a NASA Test Director. **Ed Priselac**, Shuttle Weather Officer at Cape Canaveral Air Force Station, said "If we were to get showers in the area, they would probably be relatively short-lived, so even if we get some weather in here we should be able to work around it." The STS 44 mission marked the first time that the Department of Defense had provided some mission details, though the Defense Support Program satellite's destination remained secret. "It's just made for a better camaraderie between us and NASA, and among the payload team, because we're able now to talk about it in the open," said Air Force Test Director Lt. Col. John Traxler. The STS 44 launch countdown began on time last night at 12 midnight EST at the T-43 hour mark. Managers have no issues or concerns about the vehicle at this time. Launch of Atlantis remains scheduled for the opening of a two and a half hour window at 6:51 p.m. EST. Today, the launch team is preparing for loading the fuel cell storage tanks, activating the navigation aids, and preparing the main engines for launch. At 4:00 p.m. today, the countdown will enter the first planned built-in hold at the T-27 hour mark. The hold will last four hours. Later tonight the launch team will load liquid oxygen and liquid hydrogen reactants into the Orbiter's onboard fuel cell storage tanks. This operation is scheduled from 10 p.m. tonight to 4 a.m. tomorrow. The countdown will enter a second four-hour planned hold at the T-19 hour mark which will extend from 4 - 8 a.m. Monday (November 18). Monday, the Orbiter's communications systems will be activated and the navigation aids will be tested. The Rotating Service Structure will be moved away from the vehicle at 5 p.m. Monday night. Loading the external tank will half a million gallons of liquid oxygen and liquid hydrogen propellants is scheduled to begin at 10:31 a.m. Tuesday. STS 44 crew members arrived at KSC's Shuttle Landing Facility yesterday (November 16) afternoon. Today, the crew will receive a brief medical exam, perform fit checks of equipment they will take onboard with them and review flight data files. Commander **Fred Gregory**, Pilot **Tom Henricks** and Mission Specialist **Story Musgrave** will fly in the Shuttle Training Aircraft later today. Weather forecasts for the time of launch are favorable with a 50 percent chance of having acceptable conditions at the opening of the launch window. There is a 60 percent chance of acceptable weather for the duration of the launch window. Scattered showers, the cloud thickness, and some limited possibility for ceilings below 8,000 feet are the concerns. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 17, 1991, Halvorson, FLORIDA TODAY, p. 9E, Nov. 17, 1991, L-1 Day Weather Forecast for STS 44, Nov. 18, 1991, Banke, FLORIDA TODAY, p. 1A, Nov. 18, 1991, KSC SHUTTLE STATUS REPORT, 11 A.M., Nov. 18, 1991, "Launching of Space Shuttle Set for Tuesday Night," NEW YORK TIMES, p. A6, Nov. 18, 1991, Hoversten, USA TODAY, p. 3A, Nov. 18, 1991, Leary, THE NEW YORK TIMES, p. B9, Nov. 19, 1991.]

November 18: ATLANTIS READY TO FLY

"The bottom line is that the satellite is in good shape and we're ready to launch," said Air Force Col. **John Kidd**, Mission Director for the Department of Defense. Shuttle Program Director **Robert L. Crippen** said, "We promised the Air Force we'd launch the satellite before the year was out and actually we're well ahead of the schedule." Shuttle weather watcher Air Force Capt. **Mike Adams** said, "The primary threat will be rain showers within 20 miles of the launch complex." [Halvorson, FLORIDA TODAY, p. 2A, Nov. 19, 1991, Leary, THE NEW YORK TIMES, p. B9, Nov. 19, 1991.]

November 19: STS 44 POSTPONED

Space Shuttle Program officials have worked out a schedule to remove and replace an Inertial Upper Stage (IUS) guidance and navigation component which could lead to a launch of the postponed STS 44 mission as early as Sunday, November 24. "That's the day we're going to shoot for," said KSC spokesman **Bruce Buckingham**. "We looked at all the work we need to do, laid it all side by side on paper, and it all pointed to Sunday." Launch had been scheduled for this evening during a window opening at 6:51 p.m. EST. The launch was postponed in midmorning due to a malfunctioning Redundant Inertial Measurement Unit (RIMU) aboard the IUS which would place a military satellite in a higher orbit after deployment from the Orbiter Atlantis. **Robert B. Sieck**, Shuttle Launch Director, said that the RIMU aboard the Inertial Upper Stage would have to be replaced with a spare and the replacement unit would have to be tested; the process was expected to take from five to seven days. "Our approach is to be ready to go when we get all the work done," Sieck said. "This will take us into next week." Lt. Col. **Ernie Jaskolski** said that the IUS could operate with only three pairs of navigational instruments, but that flight rules require that all such units be operational at liftoff.

"Think of it as a little light switch going on, telling you something went wrong. Well, this light went on 24 times in thee hours," said Air Force Major **Bob Thunker**, Chief of Launch Vehicle Engineering for the 6555th Aerospace Test Group at Cape Canaveral Air Force Station. "It would appear there was no way we could have known this was coming," said NASA Spaceflight Chief **William Lenoir**. Work underway at Complex 39's Pad A now includes work platform extension and offloading of fuel cell cryogenics. Pad workers should have access to the Orbiter's payload bay by Wednesday (November 20) morning, allowing removal and replacement of the malfunctioning Inertial Measurement Unit aboard the IUS. If removal, replacement and retest work goes as planned, and the new RIMU is cleared for flight, the countdown could be picked up at the T-43 hour mark at midnight on Thursday (November 21) leading to launch on November 24 at 6:31 p.m. EST. A crew statement issued through Commander **Frederick Gregory** said: "While we're anxious to begin our mission as soon as possible, we also recognize the importance of making sure that our flight is both safe and successful in completing its prime objective - the deployment of the DSP satellite. We look forward to launching as soon as we are given the go ahead." Payload Specialist

Thomas Hennen and Mission Specialist **Mario Runco** will remain at Kennedy Space Center until the launch. Commander **Frederick Gregory**, Pilot **Tom Henricks**, Mission Specialist **Story Musgrave** and, perhaps, **James Voss** will return to Johnson Space Center to practice launches in NASA's Shuttle Mission Simulator. [KSC SHUTTLE STATUS REPORT, 4:30 p.m., Tuesday, November 19, 1991, Halvorson, FLORIDA TODAY, pp. 1A-2A, Nov. 20, 1991, Leary, THE NEW YORK TIMES, p. A13, Nov. 20, 1991.]

[] **ENDEAVOUR GETS SSME'S**

"It's pretty significant for us...and it makes the vehicle look a lot more like a rocket ship," said **Eric Clanton**, Lockheed Space Operations Co. Manager in Charge of Endeavour; he referred to the installation in the newest Orbiter's of its three main engines. Clanton's NASA counterpart **John "Tip" Talone** said, "It's all starting to come together. We've got plenty of work in front of us, but we're starting to feel a lot more encouraged." [Banke, FLORIDA TODAY, p. 2A, Nov. 20, 1991.]

November 20: **STS 44: WAITING, AGAIN**

Workers at Launch Complex 39A have offloaded reactants from the fuel cell storage tanks and opened payload bay doors early this morning. Yesterday's postponement because of a faulty RIMU came before tanking operations for the launch began. Currently operations are underway to replace the defective Redundant Inertial Measurement Unit on the Inertial Upper Stage (IUS). The RIMU, built by Hamilton Standard, is the major navigation component of the upper stage. "We're in good shape as far as the change-out operation," said KSC spokeswoman **Lisa Malone**. If the new RIMU passes all its tests, countdown to launch begins, again, at 12:01 a.m. EST Friday, November 22; the payload bay doors will be closed for flight at 2:00 p.m. with a predicted launch at 6:31 p.m. EST on Sunday, November 24. Some of the STS 44 flight crew members will fly in to Kennedy Space Center this afternoon in their T-38 training aircraft. Tomorrow, November 21, Commander **Fred Gregory**, Pilot **Tom Henricks** and Mission Specialists **Story Musgrave** and **Jim Voss** are planning a brief trip to Johnson Space Center (Houston, TX) to practice in the Shuttle simulator; they will return to KSC late Friday, November 22. Crew members **Mario Runco** and **Thomas Hennen** will remain at KSC. The weather outlook for November 24 includes a 60 percent chance of acceptable weather at the opening of the launch window at 6:31 p.m. and a 70 percent chance of good weather for the duration of the launch window. [KSC SHUTTLE STATUS REPORT, 12 Noon, Nov. 20, 1991, Banke, FLORIDA TODAY, p. 1A, Nov. 21, 1991.]

[] **IML-1 INSTALLED ON DISCOVERY**

In Orbiter Processing Facility Bay 3, technicians have installed in Discovery the International Microgravity Laboratory-1 which is the centerpiece of the STS 42 mission. Leak and functional testing of the waste containment system has also been completed. Preparations have begun for the interface verification test between the payload laboratory and the Orbiter. The orbital maneuvering system

pods and the forward reaction control system are being tested; thermal protection system (tiles) operations have also begun along with checks of the main engine system. [KSC SHUTTLE STATUS REPORT, 12 Noon, Nov. 20, 1991.]

[] **ENGINES 1 & 2 INSTALLED: ENDEAVOUR**

Technicians in OPF Bay 1 have installed all three main engines in Endeavour. The third main engine was being installed today when technicians detected a problem with a liquid oxygen line which forced installation work to be halted temporarily. The line was thought to have a bad weld and was checked by X-ray; no such faulty weld was found and installation work resumed, according to KSC spokeswoman **Lisa Malone**. Work in progress: checkout of the robot arm; preparations for tests of the fuel cells; evaluation of a weld in the propellant feedline for the No. 3 main engine; testing of the orbital maneuvering system pods; thermal protection system operations; checkout of the main propulsion system; leak and functional tests of the auxiliary power units; testing of the electrical interfaces in the power reactant storage and distribution system; Ku-band systems test; environmental control system testing. Endeavour's maiden flight - STS 49 - is tentatively scheduled for April 9, 1992; preparations, however, are presently six weeks behind schedule. [KSC SHUTTLE STATUS REPORT, 12 Noon, Nov. 20, 1991, "Endeavour Gets Engine," FLORIDA TODAY, p. 4A, Nov. 21, 1991.]

November 21: **ATLANTIS: RIMU RETESTED**

"It looks like all of the problems are being fixed," said STS 44 crew member F. **Story Musgrave** before departing for Johnson Space Center for further training today. Atlantis has received a new Redundant Inertial Measurement Unit; it was installed at 4 p.m. yesterday. A retest of the unit is in progress today at Launch Complex 39A; the RIMU is the major navigational component of the inertial upper stage which will boost the Defense Support Program satellite into orbit. Purges of the power reactant storage and distribution system are also underway. The launch countdown for STS 44 resumed at 12:01 a.m. today. The payload bay doors of the Orbiter will be closed by noon today. Launch is now targeted for 6:31 p.m. EST on Sunday, November 24. Weather conditions are improving the day of launch. Forecasters are predicting a 70 percent chance of acceptable weather at the opening of the window and an 80 percent chance of good weather for the duration of the launch period. Commander **Fred Gregory**, Pilot **Tom Henricks** and Mission Specialists Story Musgrave, **Jim Voss**, **Mario Runco** and Payload Specialist **Tom Hennen** are planning a brief trip to Houston, TX, to practice ascents in the Shuttle simulator. They plan to depart the Shuttle Landing Facility in a Shuttle Training Aircraft at about 2 p.m. this afternoon and return to KSC early on November 22. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 21, 1991, Banke, FLORIDA TODAY, p. 1A, Nov. 22, 1991, "Shuttle Preparations," USA TODAY, p. 3A, Nov. 22, 1991.]

DISCOVERY: GALLEY TESTS DONE

Functional tests of Discovery's galley have been completed in OPF Bay 3. Work in progress: interface verification testing between the payload laboratory and the Orbiter; checks of the pressure in the main landing gear tires; testing of the orbital maneuvering system pods and the forward reaction control system; thermal protection system operations; installation of heat shields around the main engines; retest of APU No. 1. The Spacelab tunnel will be installed before Thanksgiving. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 21, 1991.]

ENDEAVOUR: SSME 3 INSTALLED

Technicians installed Endeavour's number 3 main engine today in Orbiter Processing Facility Bay 1. Work in progress: checkout of the robot arm; preparations for tests of the fuel cells; closeouts of the midbody of the Orbiter; evaluation of the water coolant loop No. 1 line; thermal protection system operations; leak and functional tests of the auxiliary power units; environmental control system testing. Scheduled work: electrical redundancy test of the orbital maneuvering system and reaction control system; tests of the Ku-band system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 21, 1991.]

November 22: WEATHER A LAUNCH DAY CONCERN

A cold front headed east from Texas is bringing a threat of thunderstorms and high winds to the Space Coast. Forecasters are presently predicting a 70 percent chance for launch of STS 44 at 6:31 p.m. November 24. The countdown began on schedule this morning. **Al Sofge**, Shuttle Test Director, said that the count was running smoothly except for a few "nickel and dime problems that you have when you have a complicated rocket ship." Air Force Lt. Col. **Ernie Jaskolski** said the problem with the navigation unit which had to be replaced had been traced to one of five sets of instruments in the unit's power supply. The replacement unit showed no problems of any sort during testing. [Halvorson, FLORIDA TODAY, p. 1A, Nov. 23, 1991.]

November 23: PAYLOAD CLEARED FOR LAUNCH

Air Force officials have tentatively cleared Atlantis' prime cargo, a Defense Support Program satellite, for launch November 24; the payload must pass a critical test of its replacement navigation unit. Officials expressed confidence that the replacement unit will operate properly despite the fact that workers have been unable to recreate the malfunction and explain its cause. A final decision from the Air Force will come about 9 a.m. tomorrow. Meanwhile, meteorologists are watching an approaching cold front but still predict a 70 percent chance of favorable weather tomorrow evening for the 6:31 p.m. EST launch. [Banke, FLORIDA TODAY, p. 1A, Nov. 24, 1991.]

November 24: ATLANTIS LIGHTS THE SKY

Atlantis roared off its launch pad a mere thirteen minutes late - at 6:44 p.m. EST; it rolled over onto its back and headed for orbit in an 8 1/2 flight. The Orbiter could still be seen seven minutes into its flight. Six hours after liftoff the crew deployed the Defense Support Program satellite and settled down to spend the next nine days making observations in support of the DOD program. "We had a great day," said Shuttle Launch Director **Robert B. Sieck** after liftoff. "We have a lot to be proud of, and as we look forward to Thanksgiving, we have a lot to be thankful for." The launch was delayed thirteen minutes to allow liquid oxygen propellant time to chill to a temperature of minus 323 degrees Fahrenheit. During loading, a liquid oxygen leak was discovered in the mobile launcher platform; work to fix the leak delayed the propellant's reaching the proper pre-launch temperature. STS 44 represented the last Shuttle launch under the administration of **Forrest S. McCartney**. After the successful liftoff, the launch team in Firing Room 1 gave the retired Air Force Lieut. General a standing ovation. "I've been here for all the launches, and that was a first," said Sieck. Atlantis is scheduled to land Kennedy Space Center's Shuttle Landing Facility at 2:20 p.m., December 4. On hand in the VIP Shuttle Viewing Area for the seventh night launch of the Shuttle Era were former KSC Director **Richard Smith** and actors **Dennis Quaid** and **Debra Winger**. [Broad, THE NEW YORK TIMES, p. A7, Nov. 25, 1991, Halvorson, FLORIDA TODAY, pp. 1A-2A, Nov. 25, 1991, "Hot Celebrities, Cool Weather, Big Crowds Give Atlantis A Sendoff," FLORIDA TODAY, p. 2A, Nov. 25, 1991, "Atlantis Lifts Off, Deploys Satellite," USA TODAY, p. 3A, Nov. 25, 1991.]

November 25: PICARD GREETS ATLANTIS CREW

The crew of the Space Shuttle Atlantis got a wake-up call this morning from science fiction's future as the theme song from "Star Trek: The Next Generation" was heard in the crew cabin followed by the voice of **Patrick Stewart**: "Space, the final frontier. This is the voyage of the Space Shuttle Atlantis. It's 10-day mission: to explore new methods of remote sensing and observation of the planet Earth; to seek out new data on radiation in space, and a new understanding of the effects of microgravity on the human body; to boldly go where 255 men and women have gone before. This is Patrick Stewart choosing not to outrank you as Capt. Jean-Luc Picard, saying that we are confident of a productive and successful mission. Make it so." At Port Canaveral, the two solid rocket boosters which helped propel Atlantis into space were expected to arrive this afternoon. Preliminary inspection showed some damage to the left booster, perhaps caused when it hit the water of the Atlantic Ocean. A detailed inspection will be performed once the boosters are on the stands at Hangar AF to determine the cause of damage. Sea state conditions that night were 6-8 feet. Booster performance in flight was nominal.[Banke, FLORIDA TODAY, p. 1A, Nov. 26, 1991, KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 26, 1991.]

[] DISCOVERY: TPS OPERATIONS

Processing operations continue in the OPF Bay 3 on the Space Shuttle Discovery.

Activities include: installation of the Spacelab tunnel; testing of the orbital maneuvering system pods; cleaning of the payload bay; installation of sleep stations in the crew module; closing out the midbody of the orbiter; thermal protection system operations; installation of heat shields around the main engines. Scheduled work: leak check of the Spacelab tunnel on November 29 and aft closeouts next week. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 26, 1991.]

[] ENDEAVOUR: SYSTEM TESTS

An electrical redundancy test of the orbital maneuvering system and reaction control system is underway upon Endeavour in the Orbiter Processing Facility Bay 1. Other work in progress includes: tests of the Ku-band antenna; functional test of the freon coolant loop; closeouts of the orbiter's midbody; installation of struts; tests of the fuel cells; thermal protection system operations; environmental control system testing; testing of the main propulsion system; leak checks of the potable water system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Nov. 26, 1991.]

November 27: ATLANTIS BOOSTERS

The STS 44 solid rocket boosters, which arrived at Hangar AF yesterday, are being inspected today. The exact cause of damage to the forward skirt has not yet been determined. There is a buckled area half way around the forward skirt and a torn section. There are some creases in the left forward motor case. Sea state conditions on the night of the launch were 6-8 feet. Booster performance in flight was nominal. SRB cases have been creased in the past due to high sea state conditions at the time the booster impacted the ocean. The damaged cases can not be reused. Booster employees are scheduled to have a four-day holiday weekend and will resume disassembly operations next week. It takes about 10 days to ready the segments for shipment back to the vendors for refurbishment. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Nov. 27, 1991.]

[] SPACELAB INSTALLED: DISCOVERY

In OPF Bay 3, processing workers completed the installation of the Spacelab tunnel in Discovery. Work in progress: testing of the orbital maneuvering system pods; cleaning of the payload bay; closing out the midbody of the Orbiter; thermal protection system operations; installation of heat shields around the main engines. Work scheduled includes: the installation of check valves in the main propulsion system and a leak check of the Spacelab tunnel on November 29; aft closeouts begin next week. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Nov. 27, 1991.]

[] ENDEAVOUR: ELECTRICAL REDUNDANCY TEST

In Orbiter Processing Bay 1, a number of processing activities are underway upon Endeavour: electrical redundancy test of the orbital maneuvering system and reaction control system; tests of the Ku-band antenna; functional tests of the freon coolant loop; closeouts of the Orbiter's midbody; installation of struts; tests of the fuel cells; thermal protection system operations; environmental control system

testing; testing of the main propulsion system; leak checks of the potable water system. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Nov. 27, 1991.]

BOC: EG&G STARTS TENTH YEAR

NASA's John F. Kennedy Space Center, FL, has awarded EG&G Florida, Inc., a government services division of EG&G, Inc. (Wellesley, MA), a 1-year extension of its existing contract for base operations services valued at approximately $197.1 million. The extension, effective January 1 through December 31, 1992, brings the cumulative value of the contract to $1.46 billion. This is the ninth extension to the base operations contract awarded to EG&G in January 1983. Under the cost-plus-award-fee extension, EG&G will continue to provide institutional and technical support services for utilities, grounds and facilities, administrative requirements, technical operations and health and protective services at the Kennedy Space Center. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Nov. 27, 1991.]

November 30:

KSC AWARDS

Kennedy Space Center has awarded 44 civil service and contractor employees with Manned Space Flight Awareness Program Honoree Awards. "These individuals were selected for their professional dedication to and outstanding achievement in support of the manned space flight program," said **Raymond Corey**, KSC Public Affairs Office. Nine civil service employees were honored: **Joseph Lacher, Thomas Schehl, Oscar Gamboa, Gertrude McClintock, Thomas Swanson, Larry Sloan, Retha Hart, Roger Liang** and **John Manning.** There were thirteen Lockheed Space Operations Co. employees given Honoree Awards: **Sandra Bronga, Craig Clokey, Edward Duben II, Marjorie Edwards, Denny Exley, Rebecca Ferguson, Ronald Gooden, Donna Herring, Dano LoPresti, Marilee Maddin, Claude Rhodes, David Sheriff, Wilson Williams.** Other contractor employees honored were: Val Miller and James Rymkos (Bionetics Corp.); Neil Rever (Honeywell Federal Systems Inc.); P. T. Swartley (IBM Corp.); Timothy Knowles (Martin Marietta Manned Space Systems); James Jones and Robert Rios (Rockwell International Corp.'s Rocketdyne Division); Nancy Burgess (Rockwell International Corp.'s Space Systems Division); Dennis Salmon (Michelin Aircraft Tire Corp.); Joseph Glover (Wiltech Corp.); Lisa Delaney (Grumman Technical Services Inc.); David Aungst and Michael Jacobson (Thiokol Corp.); David Allen (Johnson Controls World Services Inc.); Denise DeVito, Dennis Gardner, Lou Ann Janes and Michele Robertson (McDonnell Douglas Space Systems Co.); Patricia McDaniels (Bamsi Inc.); Albert Wallace and Lee Zook (United Technologies USBI) and **Joseph Jonakin** (Sunstrand Aerospace Mechanical Division). ["Space Center Workers' Contributions Honored," FLORIDA TODAY, p. 9E, Dec. 1, 1991.]

SNOOPY AWARDS PRESENTED

Astronauts **David Wolf** and **Rick Searfoss** presented Silver Snoopy Awards to the following EG&G Florida employees recently: **Paul Hise, Judith Hugoboom, William Parlon, Tony Peckich, Barbara Wilder** and **Lillian Barton.** The Manned Space Flight Awareness Program sponsors the Silver Snoopys; it is the second most

prestigious of the Program's awards. EG&G Florida Inc. is Kennedy Space Center's base operations contractor. ["Astronauts Present Silver Snoopy Awards," FLORIDA TODAY, p. 9E, Dec. 1, 1991.]

ATLANTIS HOME EARLY: IMU FAILURE

The Space Shuttle Atlantis will end its mission three days early because one of three navigational devices - an Inertial Measurement Unit (IMU) - has failed. "In this case, the risk of losing another IMU is low, but the gain of continued operations over the rest of the flight is probably also low," said **Gary Coen**, Mission Operations Director. "When we're in that low-risk/low-gain probability, our flight rules rationale says to be conservative and end the mission." Flight safety rules also mandate a landing at Edwards Air Force Base, CA, where the lakebed runway is longer than the Shuttle Landing Facility at Kennedy Space Center. There have been three other Shuttle missions cut short: Columbia in December 1990; Discovery in August 1985; Columbia in November 1981. [Brown, FLORIDA TODAY, pp. 1A-2A, Dec. 1, 1991.]

DECEMBER

December 1: **ATLANTIS LANDS AT EDWARDS AFB**

"Welcome home, Atlantis, and congratulations on a great flight," said astronaut **Robert Cabana** from JSC's Mission Control (Houston, TX). Cabana spoke to the six-member crew of Atlantis after it touched down on the lakebed runway of Edwards Air Force Base, CA, three days earlier and a continent away from its primary landing site, Kennedy Space Center. Touchdown came at 5:34 p.m. EST., six days, 22 hours, 50 minutes and 42 seconds after launch. Landing occurred at the conclusion of orbit 109. Preliminary inspections in California showed that Atlantis returned from space in good condition with little apparent damage to the thermal protection system. "It was an unfortunate circumstance that we had to bring the crew home early, and I'm sure they felt a little bit bad about that," said astronaut **Steve Nagel**, acting chief of the astronaut office, in a press conference held after the successful landing. "But, all in all it was a very good day for us, and we're happy to have the crew back. They're all in excellent health and good spirits and glad to be home, albeit a couple days early," he added. KSC recovery teams are at Dryden Flight Research Facility in California. It is estimated that Atlantis could depart for Florida on December 7 to begin a two-day ferry flight back to KSC. Pending the completion of planned work and good weather, the vehicle could arrive at Kennedy Space Center on Sunday, December 8. [Brown, FLORIDA TODAY, p. 1A-2A, Dec. 2, 1991, KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 2, 1991, Date, THE ORLANDO SENTINEL, Dec. 3, 1991.]

DISCOVERY: TUNNEL LEAK CHECKS

Following the installation of the Spacelab tunnel in Discovery, technicians in OPF Bay 3 conducted leak tests of the tunnel and installed check valves in the main propulsion system. Work in progress: start of aft compartment closeouts; testing of the orbital maneuvering system pods; cleaning of the payload bay; closing out the midbody of the Orbiter; thermal protection system operations. A crew equipment interface test is planned for December 4 with the STS 42 flight crew. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 2, 1991.]

ENDEAVOUR: FUEL CELL TESTS

Endeavour's fuel cells have been tested in OPF Bay 1; the payload bay doors have been closed for tile work and functional tests of the crew hatch have been completed. An anti-skid test of the Orbiter's brakes has been scheduled. Work in progress: flight readiness test of the three main engines; tests of the main engine regulators; leak and functional tests of the auxiliary power units; electrical redundancy test of the orbital maneuvering system and reaction control system; functional test of the freon coolant loop; closeouts of the Orbiter's midbody; installation of struts; thermal protection system operations; environmental control system testing; testing of the main propulsion system; leak checks of the potable water system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 2, 1991.]

December 2: **ATLANTIS: FERRY FLIGHT PLANS**

"Right now the plan is for us to ferry out Saturday morning [December 7]," said Atlantis Vehicle Manager **Bob Hill**. "If we get a few good breaks and the weather cooperates, there's a possibility we may get out Friday afternoon." An initial look at the Orbiter's brakes and tiles shows that there was very little damage to the vehicle. "What that adds up to in my book is a very clean vehicle that's not going to cause us any undue perturbations when we get back to the Cape to turn it around for the next flight," Hill added. [Banke, FLORIDA TODAY, p. 1A, Dec. 3, 1991.]

December 3: **ATLANTIS: DRYDEN FERRY OPERATIONS**

Kennedy Space Center recovery teams are preparing Atlantis for its return trip to Florida scheduled to begin later this week. If work continues to go well, there is a possibility that the ferry flight could begin Friday. A nominal two-day ferry flight is planned with a refueling and overnight stopover in Texas. Weather conditions will dictate the flight path and duration of the cross-country piggyback flight. Hydrolasing operations are underway on the STS 44 solid rocket boosters at Hangar AF to strip the cork and foam from the lower segments. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 3, 1991, Banke, FLORIDA TODAY, p. 8A, Dec. 4, 1991,KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 4, 1991.]

[] **STS 42 CREW ARRIVAL EXPECTED**

A crew equipment interface test is planned for today with the STS 42 Discovery crew on hand for the test. Sleep stations for the crew have been installed. The STS 42 includes: Commander **Ronald J. Grabe**, Pilot **Stephen S. Oswald**, Mission Specialists **Norman E. Thagard, William F. Readdy, David C. Hilmers** and Payload Specialists **Roberta L. Bondar** and **Ulf D. Merbold**. The crew is expected to remain here through Thursday (December 5). KSC spokesman **Mitch Varnes** said, "The crew is coming to inspect the interior of the module and assure themselves that everything is just as they wish."Work in progress: aft compartment closeout; test and verification of connections between the laboratory tunnel and the Orbiter and IML payload; leak checks of the main propulsion system; testing of the orbital maneuvering system pods and forward reaction control system; closing out the midbody of the Orbiter; thermal protection system operations. Current planning has Discovery being moved from OPF Bay 3 to the Vehicle Assembly Building by December 13 and to Launch Complex 39A about five days later, i.e., December 18. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 3, 1991, Banke, FLORIDA TODAY, p. 8A, Dec. 4, 1991, KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 4, 1991.]

[] **ENDEAVOUR: PROCESSING PROGRESS**

Processing activities in OPF Bay 1 on the Space Shuttle Endeavour include: Flight readiness testing of the three main engines; tests of the main engine regulators; leak and functional tests of the auxiliary power units; electrical

redundancy test of the orbital maneuvering system and reaction control system; functional test of the freon coolant loop; closeouts of the Orbiter's midbody; installation of struts; thermal protection system operations; environmental control system testing; testing of the main propulsion system; leak checks of the potable water system; anti-skid test of the Orbiter's brakes. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 3, 1991, KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 4, 1991.]

December 4: **ITALY'S MALERBA TOURS KSC**

Italy's first astronaut, **Franco Malerba**, toured Kennedy Space Center today with other Italian representatives; the group stopped to have a look at the Tethered Satellite System (TSS-1) that Malerba will help launch July 2, 1992. "I think it's an extraordinary adventure for me and the Italian aerospace industry. It's a great honor to have this responsibility," Malerba said. The Italian astronaut was accompanied by a member of the TSS-1 crew, astronaut **Jeffrey Hoffman**, who said, "Getting (the tether) back is the hardest part. I think we have a very good chance of getting the satellite out and of getting some real good science out of it. Then we're going to do our darndest to try and get it back." His concern was about the possibility that the tether might become wrapped around the Orbiter and lead to the loss of the satellite. In California, workers continued to prepare Atlantis for its return trip to Florida. [Banke, FLORIDA TODAY, p. 5A (Photo, p. 1A), Dec. 5, 1991.]

December 5: **ATLANTIS: TAIL CONE INSTALLATION**

Work continues to prepare the Orbiter Atlantis for the ferry flight which is scheduled to depart Edwards at sunrise on Saturday [December 7] for what is nominally a two-day flight to Florida. The tail cone is scheduled to be installed tonight and the Orbiter will be powered down and mated to the 747 Shuttle Carrier Aircraft tomorrow. Robotic hydrolasing operations are complete at Hangar AF and preparations are underway to remove the aft skirts. A cold front is approaching California from the northwest and a low is approaching from the southwest. It is too early at this time to determine what effect, if any, these weather systems will have on departure and the ferry flight activities. A ferry flight review is scheduled to be held at 11:30 A.M. December 6. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 5, 1991, OV-104/ATLANTIS STATUS REPORT, NASA Dryden Flight Research Facility-Edwards, CA, Dec. 5, 1991, OV-104/ATLANTIS STATUS REPORT, Dec. 6, 1991, "Atlantis Begins Trip Home Today," FLORIDA TODAY, p. 4A, Dec. 7, 1991.]

[] **CEI TEST SUCCESSFUL**

Both Discovery and its STS 42 crew have successfully passed a crew equipment interface test in Orbiter Processing Facility Bay 3. Rollover of Discovery to the Vehicle Assembly Building is planned for the end of next week. Work in progress: functional test of the landing gear; aft compartment closeout; leak checks of the main propulsion system; testing of the forward reaction control system; thermal

protection system operations. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 5, 1991.]

ENDEAVOUR: TESTING UNDERWAY IN OPF BAY 1

Installation of Endeavour's forward reaction control system is scheduled for next week in OPF Bay 1. Meanwhile, processing activities continue: brake anti-skid and nose wheel steering tests; leak and functional tests of the auxiliary power units; electrical redundancy testing of the orbital maneuvering system and reaction control system; closeouts of the Orbiter's midbody; functional test of the freon coolant loop; thermal protection system operations; environmental control system testing; testing of the main propulsion system; leak checks of the potable water system. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 5, 1991.]

December 6:

DISCOVERY: SPACELAB READY FOR PAD

Thoroughly checked out and firmly tucked into the Orbiter Discovery's payload bay, the International Microgravity Laboratory-1 (IML-1) Spacelab module is now ready to be transferred to Launch Complex 39A. IML-1 is the prime payload of STS 42, the first Space Shuttle flight of 1992. Discovery is now inside Orbiter Processing Facility Bay 3 and is scheduled to be moved to the Vehicle Assembly Building (VAB) next week. Inside the VAB, Discovery will be mated with its external tank and twin solid rocket boosters. The STS 42 launch vehicle is slated to be transported to the launch pad during the third week of December. More than two years of planning and pre-mission processing by the KSC payloads community were essentially completed this week when the STS 42 astronauts inspected the Spacelab module for the last time before their planned late January liftoff. Routine system checks through launch and stowage of some flight experiments are the only requirements left for the IML-1 processing team. "It (IML-1) has been a very clean and smooth-flowing payload," remarked **Glenn Snyder**, KSC's STS 42 Payload Processing Manager. "The contractor and NASA teams have worked hand-in-hand on IML-1, and we're now at a point where we're just about ready to fly."

IML-1 is the first of a series of IML missions planned to fly aboard the Space Shuttle this decade. All of these missions are dedicated to the study of life and materials sciences in microgravity. The missions will specifically concentrate on the intricate effects of weightlessness on living organisms and how materials react in space. The IML program is a continuation of NASA's successful multi-national space efforts. The venture is a combined partnership of NASA, the European Space Agency (ESA), the Canadian Space Agency (CSA), the French National Center for Space Studies (CNES), the German Space Agency (DARA), and the National Space Development Agency of Japan (NASDA). A seven member astronaut flight crew is scheduled to fly aboard Discovery on the IML-1 Space Shuttle mission. The crew of the fourteenth flight of the Orbiter Discovery will consist of Commander **Ron Grabe**, Pilot **Steve Oswald**, Mission Specialists **Norman Thagard, David Hilmers**, and **Bill Readdy** and Payload Specialists **Roberta Bondar** and **Ulf Merbold**. Bondar is a Canadian astronaut representing the

Canadian Space Agency; Merbold, a German citizen, will represent the European Space Agency on the IML-1 mission. [Varnes, NASA/KSC RELEASE NO. 138-91, Dec. 6, 1991.]

ATLANTIS: FERRY FLIGHT READY

Work on the Orbiter Atlantis continued on schedule today for an early December 7 morning departure from Edwards Air Force Base (CA). If weather conditions permit, Atlantis will be ferried to Kelly Air Force Base (San Antonio, TX) for refueling. If possible, Atlantis may continue on its first leg either to Columbus Air Force Base (Columbus, MS) or Eglin Air Force Base (FL). A two-day ferry flight is planned with the earliest possible arrival back at KSC judged to be mid-day Sunday. Last night, the main engine tail cone was installed on Atlantis. Hydraulic operations to position the aerosurfaces and raise the landing gear is in work. Mating to the 747 Shuttle Carrier Aircraft is scheduled for tonight with back out of the Mate-Demate Device targeted for midnight, PST. Arrival in Florida at Kennedy Space Center is expected to be about noon on December 8. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 6, 1991, OV-104, ATLANTIS STATUS REPORT, Dec. 6, 1991.]

DISCOVERY: LANDING GEAR TESTS

Technicians in OPF Bay 3 have completed landing gear functional tests on Discovery; they have also completed integrated hydraulic operations and final aerosurface cycling. Work in progress: orbital maneuvering system functional tests and checkouts; reaction control systems electrical redundancy tests; thermal protection system operations (only six tile cavities remain). Scheduled work: payload bay door cycle and towing to the Vehicle Assembly Building, now set for December 13. Launch of the STS 42 mission is scheduled tentatively for January 22, 1992. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 6, 1991, Brown, FLORIDA TODAY, p. 4A, Dec. 8, 1991.]

ENDEAVOUR: TIPS OPERATIONS

Thermal protection system operations are underway on Endeavour in OPF Bay 1. Other processing activities include: power reactant storage and distribution system tests and operations; auxiliary power unit leak and functional tests; brake anti-skid checks; main propulsion system leak checks and testing. Scheduled: Endeavour will receive its forward reaction control system from the Hypergolic Maintenance Facility. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 6, 1991.]

December 7: ATLAS LAUNCH SET FOR TODAY

"We're proceeding right ahead on schedule," said General Dynamics spokesman **Jack Isabel** concerning today's evening launch of an Atlas rocket from Launch Complex 36B at Cape Canaveral Air Force Station. An earlier Atlas rocket, carrying a Japanese communications satellite, had to be destroyed when one of its two upper-stage engines shut down. That failure was caused by debris in an

engine turbopump. The launch today will be of an upgraded Atlas Centaur called an Atlas 2; the 156-foot rocket is twenty feet taller than its predecessor and capable of lifting a 5,900 pound satellite into geosynchronous orbit. The Atlas 2 will lift about 1,000 pounds more than its predecessor. [Brown, FLORIDA TODAY, p. 4A, Dec. 7, 1991, Date, THE ORLANDO SENTINEL, Dec. 7, 1991.]

ATLANTIS RETURNS

The Space Shuttle Atlantis, atop its Shuttle Carrier Aircraft, landed today at the SLF at 12:27 p.m. Before landing at KSC, the SCA pilot flew along Brevard County's coast to give local residents and tourists a look at the returning Shuttle. Atlantis will be rolled into an OPF hangar tomorrow to undergo post-flight inspections. The return to KSC was four days later than planned. [Brown, FLORIDA TODAY, p. 4A, Dec. 8, 1991.]

ATLAS-2 LAUNCHED FROM CCAFS

The first Atlas-2 rocket launched successfully from Cape Canaveral Air Force Station's Launch Complex 36A at 5:47 p.m. The launch was delayed for 11 minutes due to the presence of aircraft in the launch area. There was also a brief delay in confirming that the $85 million Eutelsat had separated from its booster. "A few anxious moments, but the first Atlas-2 with the Eutelsat spacecraft was a success," said Air Force launch commentator **Jim Codd**. "I can't tell you how important this launch is to our future commercial business," said **Charlie Lloyd**, General Dynamics Vice President and Managing Director of the Commercial Launch Division. [Brown, FLORIDA TODAY, p. 1A, Dec. 8, 1991, Date, THE ORLANDO SENTINEL, Dec. 8, 1991.]

NASA EXTENDS EG&G CONTRACT

EG&G Florida, Inc.'s Base Operations Contract at Kennedy Space Center was extended for another year today by NASA. The extension is valued at about $197.1 million, raising the value of the overall BOC to $1.46 billion, according to NASA officials. EG&G has held the BOC at KSC since January 1983. ["NASA Extends EG&G Pact at KSC," FLORIDA TODAY, p. 10E, Dec. 8, 1991.

SPACE STATION BUILDING CONSTRUCTION

Officials at Kennedy Space Center are confident that the new Space Station Processing Facility now under construction at KSC will be ready to receive flight hardware on schedule. The facility's completion date is August 1994. "We're moving along very well on this project. As early as October of 1993, we'll have enough of the facility finished - the high bay will be completed - where we can start installing some of the cables and ground support equipment," said **Dick Lyon**, Space Station Manager at KSC. "It's the last place on Earth where you'll be able to touch the flight hardware and run a final test. And that's exactly what our job is. We expect the first flight hardware in less than four years, so we are truly excited. Kennedy Space Center is the home of excitement. That's where you're

just a few weeks ahead of the fire and smoke and going into orbit." [Banke, FLORIDA TODAY, p. 10E, Dec. 8, 1991.]

[] DUFFY AWARDED SILVER SNOOPY

Phillip Duffy, an employee at Kennedy Space Center with McDonnell Douglas Space Systems Co., has been awarded a Silver Snoopy by astronaut **Dave Wolf**. Duffy was recognized for his work on the Spacelab intercom system used during Columbia's June mission. ["Coveted Award Doled Out by NASA Astronaut," FLORIDA TODAY, p. 9E, Dec. 8, 1991.]

December 8: DISCOVERY: IML-1 CLOSED FOR FLIGHT

The International Microgravity Laboratory-1, primary payload of the STS 42 mission aboard Discovery, has been closed out for flight. Discovery has had its final payload bay cleaning; its Ku-band antenna has been stowed for flight; the aft engine compartment has been closed and orbital maneuvering system tests have been completed. Work in progress: closing the payload bay doors for flight; functional testing of the landing gear; leak checks of the main propulsion system; testing of the forward reaction control system; thermal protection system operations. Rollover of Discovery from OPF Bay 3 to the Vehicle Assembly Building is scheduled for December 13. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 9, 1991, Brown, FLORIDA TODAY, p. 7A, Dec. 10, 1991.]

[] ATLANTIS TOWED TO OPF BAY 2

The Space Shuttle Atlantis, which returned to Kennedy Space Center yesterday afternoon by Shuttle Carrier Aircraft, was towed to OPF Bay 2 at 6 a.m. this morning. Atlantis and its SCA left Dryden Flight Research Facility December 7 and spent the night at Shepard Air Force Base (Wichita Falls, TX) before completing its ferry flight to KSC. Workers are presently jacking and leveling the Orbiter and gaining access to various areas of the vehicle such as the crew cabin and aft compartment. Scheduled work includes: opening the payload bay doors; removing the tail cone and ferry flight fittings; detailed inspections of the vehicle and removal of the wheels and tires. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 9, 1991.]

[] ENDEAVOUR: FRCS INSTALLATION SCHEDULED

The Space Shuttle Endeavour will have its forward reaction control system installed tomorrow in OPF Bay 1. Current work in progress: preparations to install the FRCS; installation of heat shields around the three main engines; leak and functional tests of the auxiliary power units; functional tests of the freon coolant loop; closeouts of the Orbiter's midbody; thermal protection system operations; environmental control system testing; testing of the main propulsion system; leak checks of the potable water system. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 9, 1991.]

December 10: DISCOVERY: PAYLOAD DOORS CLOSED

The payload bay doors of the Space Shuttle Discovery have been closed by technicians processing the Orbiter for its STS 42 flight in OPF Bay 3. Work in progress includes: cycles of the nose landing gear door to check the fit of the tile and thermal barriers; closing out the crew module; testing of the forward reaction control system; thermal protection system operations. Scheduled work: determination of the Orbiter's weight and center of gravity on December 11 and the rollover to the VAB targeted for the morning of December 13. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 10, 1991.]

[] ATLANTIS: POST-FLIGHT INSPECTIONS

Preparations are underway in OPF Bay 2 to open the newly returned Atlantis' payload bay doors and to remove the tail cone and ferry flight fittings. Technicians are also working to gain access to various areas of the vehicle such as the crew cabin and aft compartment. Detailed post-flight inspections of the Orbiter are scheduled along with removal of the vehicle's wheels and tires. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 10, 1991.]

[] ENDEAVOUR PROCESSING PROGRESS

Work in progress in OPF Bay 1 on the Space Shuttle Endeavour includes: preparations to install the forward reaction control system; installation of heat shields around the three main engines; leak and functional tests of the auxiliary power units; functional tests of the freon coolant loop; closeouts of the Orbiter's midbody; thermal protection system operations; environmental control system testing; testing of the main propulsion system; leak checks of the potable water system. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 10, 1991.]

December 11: DISCOVERY: CREW HATCH CLOSED

Technicians in OPF Bay 2 have closed Discovery's crew module hatch as part of the processing effort for the Orbiter's STS 42 mission; the vehicle's final power down has been completed, too. Determination of Discovery's weight and center of gravity continues as do thermal protection system operations. Scheduled work: attaching the Orbiter to the Orbiter transport tonight; retracting the landing gear tomorrow and rollover to the VAB is scheduled for tomorrow afternoon. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 11, 1991.]

[] ATLANTIS: WHEELS AND TIRES REMOVED

The wheels and tires have been removed from Atlantis in OPF Bay 2. Work in progress: preparations to open the payload bay doors; preparations to remove the tail cone and ferry flight fittings ; post-flight tile inspections and stacking of the right aft booster in the Vehicle Assembly Building. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 11, 1991, "NASA May Move Discovery Early," FLORIDA TODAY, p. 5A, Dec. 11, 1991.]

ENDEAVOUR: FRCS INSTALLED

Endeavour's forward reaction control system has been installed. Work in progress: connections of the forward reaction control system; installation of heat shields around the three main engines; tests of the power reactant storage and distribution system; leak and functional tests of the auxiliary power units; functional tests of the freon coolant loop; closeouts of the Orbiter's midbody; thermal protection system operations; environmental control system testing; testing of the main propulsion system and leak checks of the potable water system. [KSC SHUTTLE STATUS REPORT, 10:30 A.M., Dec. 11, 1991.]

December 12: **DISCOVERY: MEASUREMENTS COMPLETE**

Technicians in Orbiter Processing Facility Bay 3 have determined the weight and center of gravity of Discovery and have attached the Orbiter to its transporter. Workers are currently retracting Discovery's landing gear and preparing to transfer the vehicle to the Vehicle Assembly Building at about 4 p.m. this afternoon. Scheduled work includes: mating Discovery to its external tank and solid rocket boosters; the Shuttle Interface Test (set for Dec. 16), to verify connections between the vehicle elements and the launch platform; rollout to Launch Complex 39A is planned for December 18. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 12, 1991, Banke, FLORIDA TODAY, p. 3A, Dec. 13, 1991.]

ATLANTIS: TAIL CONE REMOVED

The tail cone has been removed from the Space Shuttle Atlantis in OPF Bay 2 and the vehicle's payload bay doors have been opened. Workers are offloading STS 44 payload hardware from the payload bay; removing ferry flight fittings; inspecting the thermal protection system for flight damage and stacking the right aft booster in the VAB. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 12, 1991.]

ENDEAVOUR: HEAT SHIELDS INSTALLED

Technicians in Orbiter Processing Facility Bay 1 have installed heat shields around the Endeavour's three main engines. Endeavour is scheduled to make its maiden voyage - STS 49 - in April of next year. Work in progress: electrical connections of the forward reaction control system; functional tests of the star tracker door; leak and functional tests of the water spray boilers; tests of the power reactant storage and distribution system; leak and functional tests of the auxiliary power units; thermal protection system operations; environmental control system testing; main propulsion system testing; and leak checks of the potable water system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 12, 1991.]

CHALLENGER TAPES: NO RELEASE

U. S. District Judge **Norma Holloway Johnson** ruled today that NASA will not have to release sound recordings of the last moments in the lives of the Challenger 7

astronauts; the space agency had already released transcripts. The suit had been brought by The New York Times which argued that the recording might help show what caused the accident in which the crew was killed on January 28, 1986. Judge Johnson said, "Even assuming...there is some voice inflection or background noise on the tape which indicates that the astronauts knew they were going to die, this court cannot see how that information contributes to the public's knowledge of how NASA operates." The judge noted that NASA had released a complete transcript and said that a release of the tape could lead to "a disruption of [the surviving families] peace of mind every time a portion of the tape is played within their hearing." ["Challenger Tapes To Remain Secret," FLORIDA TODAY, p. 1A, Dec. 13, 1991, "Challenger Tapes," USA TODAY, p. 3A, Dec. 13, 1991, Lewis, THE NEW YORK TIMES, p. A20, Dec. 13, 1991.]

BIONETICS GETS KSC CONTRACT

Bionetics Corp. (Hampton, VA) has won the photographic services contract at Cape Canaveral Air Force Station and Kennedy Space Center. TGS Technology Inc., a subsidiary of Johnson Controls World Services, Inc., had held the contract for the past 26 years. All existing collective bargaining agreements for the 147 TGS employees will be honored, according to union business manager **Andrew Younger.** "That doesn't necessarily mean they'll all be picked up," Younger added. Bionetics already employees 150 people under a life sciences contract and a Shuttle instrumentation contract. The photographic services contract: photographs launches and other activities at KSC and the 45th Space Wing located at Patrick Air Force Base; operates tracking stations and maintains KSC's photo library. [Brown, FLORIDA TODAY, p. 20C, Dec. 13, 1991.]

SHUTTLE PROGRAM CONSOLIDATION

Reorganization of the Shuttle Program should be complete by late 1993, according to NASA Space Flight Chief **William Lenoir.** "We are in the process of eliminating a whole layer of management in the Space Shuttle," said Lenoir. He and his staff are working "to determine what functions in each of those [Space Shuttle] offices should stay where they are and what functions should go to the Cape," according to Lenoir. He said the main shift in personnel would be evidenced in the relocation of about 50 managers from NASA's Headquarters to Kennedy Space Center. Moves from the other centers, Lenoir indicated, would be less "profound." [Eisler, FLORIDA TODAY, p. 1A, Dec. 13, 1991.]

PAD REPAIR DELAYS LAUNCH: CCAFS

NASA and the Air Force have decided to proceed with needed repairs of Launch Complex 17A at Cape Canaveral Air Force Station even though the repairs will delay the launch of a $110 million NASA science satellite, officials said today. **Jim Barrowman**, NASA Project Manager, said that an April launch is still in the planning stages. "It's really going to depend on the Air Force's ability to get all the pad modifications done. I know they are going to do their damndest to get

that done as soon as possible," Barrowman said. [Banke, FLORIDA TODAY, p. 3A, Dec. 13, 1991.]

December 13: **STS 42: DISCOVERY TO VAB**

Discovery's rollout to Launch Complex 39A on December 18 will be its first step toward the first launch of 1992. Yesterday, at 4:32 p.m., Discovery was moved from Orbiter Processing Facility Bay 3 to the nearby Vehicle Assembly Building where it is being mated with the external tank and solid rocket boosters. Discovery is being prepared for its STS 42 International Microgravity Laboratory-1 (IML) mission currently planned for the third week of January 1992. The Orbiter's 14th flight is a seven-day mission and carries a seven-member crew. Flight preparations on Discovery for the STS 42 mission began September 27, following its last mission, STS 48, which ended with a landing at Edwards Air Force Base, CA. Discovery was the first Orbiter prepared for flight in Orbiter Processing Bay 3 which was equipped in September 1991 to support full-scale Shuttle processing, testing and checkout. All of the vehicle's systems were fully tested during its 10-week stay in the OPF.

Space Shuttle main engine locations for STS 42 are as follows: engine 2026 in the No. 1 position, engine 2022 in the No. 2 position, and engine 2027 in the No. 3 position. These engines were installed October 24-25, 1991. The Crew Equipment Interface Test with the STS 42 flight crew was conducted December 4 in the OPF; the test provides an opportunity for the crew to become familiar with the configuration of the Orbiter and anything that is unique to the STS 42 mission. Technicians installed the International Microgravity Laboratory payload into Discovery's payload bay on November 17 while the vehicle was in the Orbiter Processing Facility; the payload bay doors were closed for flight in the OPF December 9. Booster stacking operations on mobile launcher platform 3 began October 1, and were completed by October 21; the external tank was mated to the boosters on November 4. After the vehicle is secured to the pad (hard down) next week, technicians will hook up ground power supplies, ground cooling and conditioned air to the vehicle elements. STS 42 processing teams will be off the Christmas and New Year's Day holiday period. The Terminal Countdown Demonstration Test, a full rehearsal of launch day activities with the STS 42 flight crew in attendance, is planned to occur January 6-7. While the crew is at Kennedy Space Center, they will be trained in emergency escape procedures at the launch pad, and will practice driving in the armored personnel carriers. The mock countdown is scheduled to begin at 8 a.m. on January 6, and will culminate with a simulated engine cutoff shortly after 11 a.m. EST on January 7.

A standard 43-hour launch countdown is scheduled to begin three days prior to launch; during the countdown, the Orbiter's onboard fuel and oxidizer storage tanks will be loaded and all Orbiter systems will be prepared for flight. About nine hours before launch, the external tank will be filled with its flight load of 500,000 gallons of liquid oxygen and liquid hydrogen propellants. About two and one-half hours before liftoff, the flight crew will begin taking their assigned seats in the crew cabin. Landing is planned at Edwards Air Force Base (CA) because of the heavier

weight of the vehicle returning to Earth with the IML tucked inside its payload bay. KSC's landing convoy teams will be on station in California to safe the vehicle on the runway and prepare it for the cross-country ferry flight back to Florida. Five days are needed at Dryden Flight Research Facility to prepare the Orbiter for the ferry flight and bolt it to the 747 Shuttle Carrier Aircraft. A two-day ferry flight is scheduled. On its return to Florida, Discovery will be taken out of flight status for the next eight and one-half months while undergoing major modifications, upgrades and required inspections. The shuttle processing team will perform this work on Discovery in the Orbiter Processing Facility. Discovery's 15th space flight, planned for the fall of 1992, is designated STS 53, a Department of Defense flight. [NASA/KSC Release No. 139-91, Dec. 13, 1991, KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 13, 1991.]

STS 45: MAIN ENGINES POSITIONED

The main engines of Atlantis have been repositioned along with its orbital maneuvering system engines in preparation for its STS 45 mission next year. Work in progress: tests of the fuel cells; deconfiguring the aft flight deck from the STS 44 mission; offloading STS 44 payload hardware from the payload bay; removal of ferry flight fittings; post-flight tile inspections; tensioning the hold down posts for the aft boosters in the Vehicle Assembly Building. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 13, 1991.]

ENDEAVOUR: INTERFACE VERIFICATION TESTS

Technicians in OPF Bay 1 are progressing on a number of tasks in the processing of Endeavour for its maiden STS 49 flight: interface verification tests of the forward reaction control system; functional tests of the star tracker door; leak and functional tests of the water spray boilers and auxiliary power units; tests of the power reactant storage and distribution system; leak checks of the potable water system; thermal protection system operations; environmental control system testing; testing of the main propulsion system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 13, 1991.]

December 14: **NASA: LOCKHEED "EXCELLENT"**

NASA has awarded Lockheed Space Operations Co. a rating of "excellent" for its work in processing Space Shuttles for launch during the period of April 1 through September 30. Lockheed President **Gerry Oppliger** said, "We have an excellent, highly efficient processing system in place and it's staffed by the world's finest space professionals. This super recognition of their performance is a great way to end an outstanding year." [Halvorson, FLORIDA TODAY, p. 10E, Dec. 15, 1991.]

December 16: **SHUTTLE INTERFACE TEST**

Technicians will conduct a Shuttle Interface Test on Discovery today (12:01 a.m.) in the Vehicle Assembly Building, according to Kennedy Space Center

spokeswoman **Lisa Malone**. Prior to the test, electrical connections between Discovery and its external tank and solid rocket boosters must be made and a test will be done to verify that the connections were made properly. Rollout is now expected to come early on December 18, beginning at 8 a.m. "Basically, we're going to get out there to the pad, secure the Shuttle and button it up for the holidays," said **Lisa Malone**. [Halvorson, FLORIDA TODAY, p. 1A, Dec. 15, 1991, Halvorson, FLORIDA TODAY, p. 1A, Dec. 16, 1991.]

NICHOLSON NAMED SHUTTLE CHIEF

Leonard Nicholson has been named to succeed **Robert L. Crippen** as Director of the Space Shuttle Program. Nicholson had served the program as its Deputy Director; Crippen succeeds **Forrest S. McCartney** as Kennedy Space Center Director on January 1, 1992. NASA spokesman **James Hartsfield** said Nicholson was "the logical choice. The position he has held since 1989 has been the second highest in the Shuttle Program." Part of Nicholson's job will involve the consolidation of the Shuttle Program under his direction at Kennedy Space Center. In 1992, NASA plans to transfer up to 100 top Shuttle Program Managers to KSC from their current locations at NASA Headquarters, Johnson Space Center and Marshall Space Flight Center. The restructured Space Shuttle organization reflects recommendations made to NASA by former Deputy Administrator James R. Thompson to streamline Shuttle management by dissolving the Shuttle Program Office at NASA Headquarters and locating the core of the Shuttle Program Management Team at KSC.Effective January 1, 1992, the Program Director function will reside at KSC. Functions formerly conducted at Headquarters, such as systems engineering and analysis, program control and development of the Shuttle manifest, will be consolidated under the program director at the field offices. A small Space Shuttle Program staff will remain at NASA Headquarters to support necessary external activities and to provide a continuous linkage between Headquarters and the program in the field. Civil service personnel who served in the Shuttle Program Office at NASA Headquarters are being relocated into other divisions at Headquarters. Nicholson, who is 53, joined NASA in 1963 as an engineer located at Johnson; he held a number of senior positions at JSC, including technical assistant to the Apollo Program Manager, technical assistant to the JSC Director and Payload Manager for Shuttle Operations at KSC. A 1963 graduate of West Virginia University with a M.S. in mechanical engineering, Nicholson has received a number of NASA awards, including the Exceptional Service Medal and two NASA Outstanding Leadership Medals. Born in Atlanta, GA, Nicholson is married to the former **Linda Fogarty** of New Orleans, LA. [Halvorson, FLORIDA TODAY, p. 5A, Dec. 17, 1991, NASA/KSC News Release No. 91-208, Dec. 16, 1991, "Shuttle Chief," USA TODAY, p. 3A, Dec. 17, 1991, "NASA Appoints Nicholson As Head of Shuttle Program," THE ORLANDO SENTINEL, Dec. 17, 1991.]

DISCOVERY'S ROLLOUT DELAYED

The rollout of Discovery to Launch Complex 39A is being delayed one day because of problems that arose while technicians were aligning a seal around an

umbilical that routes electrical lines between the Orbiter and its fuel tank. KSC spokesman **Bruce Buckingham** said, "The seal slipped slightly, went a bit askew, and they had to go back and readjust it." A two-day test was delayed by the problem; the test will now be completed today. Buckingham said the delay in rolling out Discovery to the launch pad will not affect plans to launch on January 22 though a firm date will be announced after the Flight Readiness Review which culminates January 9, 1992. [Halvorson, FLORIDA TODAY, p. 5A, Dec. 17, 1991.]

December 17: **DISCOVERY: SIT UNDERWAY**

Technicians in the Vehicle Assembly Building have closed out connections of the electrical monoball area on the liquid hydrogen and liquid oxygen 17-inch umbilicals and the external tank and Discovery in preparation for its January 1992 STS 42 mission. A Shuttle Interface Test is underway to verify connections between the vehicle elements and launch platform. Scheduled work includes: rollout to Launch Complex 39A at 12:01 a.m., December 19; a Terminal Countdown Demonstration Test is set for January 6-7; the STS 42 Flight Readiness Review is planned for January 9 with launch targeted, tentatively, for January 22. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 17, 1991.]

[] **STS 45: ATLANTIS' APU'S DESERVICED**

Orbiter Processing Facility Bay 2 technicians have deserviced lube oil from Atlantis' auxiliary power units as part of the processing effort for STS 45. Work in progress: post-flight checks of the main engines; tests of the Orbiter's fuel cells; preparations to deservice the reaction control and orbital maneuvering systems; inspections of the 17-inch disconnects; stacking the right aft center segment in the Vehicle Assembly Building. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 17, 1991.]

[] **ENDEAVOUR: MAIN LANDING GEAR CYCLED**

Endeavour's main landing gear has been cycled in OPF Bay 1 and a functional test of the Orbiter's freon coolant loop has been completed as well. Work in progress: functional tests of the crew hatch; functional test of the star tracker door; adjustments of the brake pedal transducer; leak and functional tests of the water spray boilers and the auxiliary power units; thermal protection system operations and leak checks of the main propulsion system and the potable water system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 17, 1991.]

December 18: **HFS INC. AWARDED KSC CONTRACT**

HFS, Inc. (McLean, Virginia) has won a contract from NASA's John F. Kennedy Space Center to create a prototype of a computer system which will store and access information for the Launch Processing System (LPS). The firm fixed price contract is valued at $169, 412 and covers seven pieces of computer hardware that comprise this mini-storage system. The system is being developed to replace existing 15-inch reel tapes which must be hand-loaded with smaller cartridge-type

tapes. Successful application of this system could lead to a computer tape library for the LPS. The LPS is a highly automated, computer-controlled system that oversees the entire checkout and launch process. The system continually monitors the Space Shuttle and its ground components and automatically alerts the system operator of any deviations. Delivery of the prototype system is tentatively scheduled for the end of January. [NASA/KSC News Release No: 141-91, Dec. 18, 1991.]

DISCOVERY: ROLLOUT PREPARATIONS

In the Vehicle Assembly Building, the Space Shuttle Discovery is being readied for rollout - 2 a.m., December 19 - to Launch Complex 39A for its STS 42 mission. Also in progress: the Shuttle Interface Test to (see story above) and leak checks of the connecting interfaces (17-inch disconnect) between the external tank and the Orbiter. **Lisa Malone**, KSC spokeswoman said, "Our plan is to get to the launch pad and have the Orbiter secured by the holidays." [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 18, 1991, Brown, FLORIDA TODAY, p. 4A, Dec. 18, 1991, "Shuttle Discovery Ready for Rollout," FLORIDA TODAY, p. 2A, Dec. 19, 1991.]

STS 45: BOOSTER STACKING IN VAB

In preparation for Atlantis' STS 45 mission, the right aft center segment to the right booster has been stacked in the Vehicle Assembly Building. Work in progress: inspections of several of the reinforced carbon carbon T-seals and panels on the leading edges of the wings; post-flight checks of the main engines; tests of the fuel cells; preparations to deservice the reaction control and orbital maneuvering systems; inspections of the 17-inch disconnects; preparations to stack the right forward center segment in the Vehicle Assembly Building. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 18, 1991.]

STS 49: STAR TRACKER DOOR TESTS

Functional tests of the star tracker door for Endeavour have been completed; the external tank umbilical doors for tile work has been cycled. Work in progress: functional tests of the crew compartment hatches; adjustments of the brake pedal transducer; leak and functional tests of the water spray boilers and auxiliary power units; thermal protection system operations and leak checks of the potable water system and main propulsion system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 18, 1991.]

COLUMBIA UPDATE: PALMDALE, CA

Columbia was powered up early this morning for systems testing. The Orbiter is undergoing major modifications while at the Rockwell manufacturing plant (Palmdale, CA). The vehicle will remain powered up for the next two weeks for verification testing. Structural inspections and X-rays of critical areas will follow power up tests. Columbia is scheduled for return to Florida at the end of next

month. Its next flight, the first extended duration mission in the Shuttle Program, is STS-50 with the United States International Microgravity Laboratory payload. STS 50 is planned for launch next summer on a 13-day flight with a crew of seven. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 18, 1991.]

December 18: **TSS MILESTONE REACHED AT KSC**

A milestone in processing the Tethered Satellite was achieved today at Kennedy Space Center when the spacecraft was mated to the satellite support assembly (SSA). The Tethered Satellite System (TSS), one of the two primary payloads of Mission STS 46, is an international cooperative mission between NASA and Italy. The SSA, a cone-shaped structure in which the satellite rests, contains a deployer boom. The SSA is mounted on an experiment pallet together with the associated reel assembly. The associated reel assembly was attached to the pallet earlier this year and the tether was wound in September. The tether is a dielectric Kevlar cord which has a diameter roughly equivalent to that of pencil lead. Three principal experiments are contained within the satellite which will be deployed to a distance of 12 and a half miles from Atlantis during the one-week STS 46 mission next summer. The recent turnover of the satellite from the Italian Space Agency (ASI) to the Nova-KSC experiment integration team for today's mating also integrated testing with the other TSS hardware elements can begin on schedule next month. The next event, attaching the satellite to the deployer boom, is scheduled immediately after the Christmas holidays. A team of approximately 25 Italians have been at KSC the last several months performing experiment testing in the Operations and Checkout Building to prepare the satellite for its mission. Following the completion of integrated testing in March, the pallet with TSS will be moved into a test stand to begin tests with the Cargo Integrated Test Equipment (CITE). This test verifies the payload's compatibility and readiness to be integrated with the Space Shuttle. The payload is scheduled to be transferred to the launch pad in early June for installation in Atlantis' payload bay. [NASA/KSC News Release No. 142-91, Dec. 18, 1991.]

December 19: **DISCOVERY ROLLS TO LC 39A**

The Space Shuttle Discovery rolled out of the Vehicle Assembly Building at Kennedy Space Center this morning at 1:39 a.m. on the first leg of its STS 42 journey. The trip to the pad took about seven hours, according to NASA spokeswoman **Lisa Malone**; Discovery was hard down on the pad's pedestals at 8:40 a.m. A key test of electrical and mechanical connections between the Orbiter, its solid rocket boosters and its external tank was successfully completed yesterday; leak checks of the connecting interfaces (17-inch disconnects) between the external tank and the Orbiter were also completed. The pad's protective service structure was moved to surround the Shuttle after an APU test. Work in progress: making connections between the launch pad and the STS 42 vehicle elements and preparations to hot fire auxiliary power unit number 1 tonight. Scheduled work includes: tests of the solid rocket boosters' hydraulic system early December 20; buttoning up the vehicle and powering down for the holiday period; Terminal Countdown Demonstration Test set for January 6-7; Flight

Readiness Review planned for January 9. Most KSC workers will begin a two-week holiday vacation once Discovery is hard down at the pad. ["Shuttle Discovery Ready for Rollout," FLORIDA TODAY, p. 2A, Dec. 19, 1991, "Rolling Out New Year's First Orbiter," picture, FLORIDA TODAY, p. 1B, Dec. 20, 1991, KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 19, 1991, "Shuttle On Launch Pad for Spacelab Mission," THE WASHINGTON TIMES, Dec. 20, 1991, "Shuttle Preparation," USA TODAY, Dec. 20, 1991.]

[] **ATLANTIS: OMS DESERVICED**

The orbital maneuvering system and reaction control system of Atlantis have both been deserviced in OPF Bay 1. Technicians are also working on other tasks: inspections of several of the reinforced carbon-carbon T-seals and panels on the leading edges of the wings; post-flight checks of the main engines; tests of the fuel cells; inspections of the 17-inch disconnects; stacking of the right forward center segment in the Vehicle Assembly Building. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 19, 1991.]

[] **ENDEAVOUR: PROCESSING FOR STS 49**

Work in progress for Endeavour's STS 49 mission includes: a brake anti-skid test; functional tests of the crew compartment hatches; adjustments of the brake pedal pressure; leak and functional tests of the water spray boilers and auxiliary power units; thermal protection system operations; leak checks of the potable water system and main propulsion system. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 19, 1991.]

[] **COLUMBIA: MODIFICATION UPDATE**

Columbia was fully powered up yesterday for systems testing. The Orbiter was undergoing major modifications while at the Rockwell manufacturing plant (Palmdale, CA). The vehicle will remain powered up for the next two weeks for verification testing. Structural inspections and X-rays of critical areas will follow power up tests. Columbia is scheduled for return to Florida at the end of next month. Its next flight, the first extended duration mission in the Shuttle Program, is STS 50 with the United States International Microgravity Laboratory payload. STS 50 is planned for launch next summer on a 13-day flight with a crew of seven. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 19, 1991.]

December 20; **STS 42: APU 1 HOT FIRED**

At Launch Complex 39A, Discovery's Auxiliary Power Unit #1 has been hot fired and the SRB flight readiness hydraulic tests have been completed. The rotating service structure is in place around the Orbiter. Work in progress: launch pad validations following APU hot fire; preparations for loading of hypergolic fuels next year; space vehicle holiday securing and power down operations. Work scheduled: the vehicle will be powered down for the holidays during the second shift tonight with power on operations resuming after the first of the year. [KSC

SHUTTLE STATUS REPORT, 10 A.M., Dec. 20, 1991, Brown, FLORIDA TODAY, p. 5A, Dec. 21, 1991.]

[] **STS 45: OMS DESERVICED**

The orbital maneuvering system of Atlantis has been deserviced in OPF Bay 2; APU deservicing operations and main propulsion system helium leak and functional tests have also been completed. Work in progress: fuel cell inspections and tests; preparations for removal of APU 1 and 2; closeouts of solid rocket booster joints in VAB and preparations for holiday power down. Atlantis is scheduled to be powered down at the end of today's first shift. The International Microgravity Laboratory is in the Orbiter payload bay and it has been closed out for flight. The payload bay doors are not scheduled to be opened prior to flight. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 20, 1991.]

[] **ENDEAVOUR: WORKING THRU THE HOLIDAYS**

In OPF High Bay 1, Endeavour's water spray boiler leak and functional tests have been completed. Potable water leak checks have been done and tests have also been completed on the Orbiter's Ku-band power amplifier and anti-skid brakes. Work in progress: thermal protection system operations; APU leak and functional tests; main propulsion system leak checks and testing. Work is scheduled to continue on Endeavour through the holiday period with the exception of the holidays themselves. Much of the work will center on closeouts of the mid-body. "It's an opportunity to catch up on some work that needs to be done with the power off," according to KSC spokesman **Bruce Buckingham**. "Given the option to work, there was no shortage of volunteers" to work during the holiday period, he said. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 20, 1991, Brown, FLORIDA TODAY, p. 5A, Dec. 21, 1991.]

[] **COLUMBIA: PALMDALE MODIFICATIONS**

The Space Shuttle Columbia will remain powered up through the holidays as work on the vehicle continues. Structural inspections and tests in critical areas are part of the remaining modifications and refurbishments scheduled for the next two weeks. Columbia is targeted for its ferry flight return to KSC around the end of January. Processing will then begin for its next mission, STS 50, the first extended duration Orbiter mission scheduled to last 13 days. [KSC SHUTTLE STATUS REPORT, 10 A.M., Dec. 20, 1991.]

December 22: ADMINISTRATOR FLETCHER DIES

Two-time NASA Administrator Dr. **James C. Fletcher** died of cancer today, his family said. He was 72. Fletcher was first NASA Administrator from April 1971 through May 1977 and again accepted the position after the Challenger explosion, holding the post from May 1986 through April 8, 1989. In his second term as head of NASA, he put a greater emphasis on quality control and safety in the Shuttle Program. ["Former NASA Chief Fletcher Dies of Cancer," FLORIDA

TODAY, p. 1A, Dec. 22, 1991, "2-Time NASA Chief James Fletcher Dies of Cancer," THE ORLANDO SENTINEL, p. A-5, Dec. 24, 1991, Brown, FLORIDA TODAY, p. 2A, Dec. 24, 1991.]

December 28: **GIFT GANTRY REMODELED**

The facilities at Spaceport USA, just west of Kennedy Space Center, have been remodeled, according to **Tom Blair**, Marketing Supervisor for TW Inc. which operates the attraction. Areas remodeled include the Gift Gantry, the Lunch Pad Restaurant and the Flight Crew Training Building. Blair said, "We're expanding in the belief that long-term, the visitors will be there, and we'll be ready." Attendance is down 16.7 percent from 1990 for an estimated 2.6 million by year's end. Spaceport USA still ranks as the fourth most popular attraction in Florida after Disney World, Sea World and Busch Gardens. [Reid, FLORIDA TODAY, p. 12C, Dec. 28, 1991.]

[] **SHUTTLE PUMPS PASS TEST**

The lack of money in NASA's budget will force a two-year delay in certifying a newly designed turbopump for the Space Shuttle. Boyce Mix, Acting Manager of the Main Engine Project Office at MFSC, said, "We're disappointed. As a result, Pratt & Whitney is going to have to lay off some people and we've scoped down our test program to concentrate on the liquid oxygen pump." The new liquid and hydrogen pumps are designed to be safer and cheaper to operate than the current pumps which are Rocketdyne products. The liquid hydrogen pump's development will be retarded by the lack of money. [Banke, FLORIDA TODAY, Dec. 29, 1991.]

December 29: **CONTRACTOR AWARD WINNERS**

NASA Manned Flight Awareness awards have b3een given to ten Kennedy Space Center Shuttle workers from USBI and EG&G Florida: **Randy Smith, Bill McAninch, Louis Conner,** and **Larry Wray** (all from USBI) and **John Jernoske, Frank Jackson, Charles "Charlie" O'Connor, Mitchell Becker, Immanuel Bartolo** and **Robert Ouellette** (all from EG&G Florida). The Manned Flight Awareness award is "given to government and industry workers for dedication to ensuring astronaut safety and Shuttle mission success." ["10 KSC Workers Honored by NASA," FLORIDA TODAY, p. 9E, Dec. 29, 1991.]

[] **KSC AWARDS RESEARCH GRANTS**

Kennedy Space Center has awarded four Small Business Innovation Research grants totaling $1.73 million. The winners are: Biotronics Technologies, Inc. (Waukesha, WI), for an online microbiological analyzer to support the firm's work on a KSC life sciences program; Hughes Associates (Wheaton, MD) for development of an ozone-friendly fire suppressant; Stottler Henke Associates (Belmont, CA) for a computerized technique for scheduling and Shuttle processing; Symbiotics Inc. (Cambridge, MA) for integrating and coordinating

intelligent planning and scheduling tools. Another $65 million worth of grants will be awarded in February 1992. ["NASA Awards Research Grants," FLORIDA TODAY, p. 10E, Dec. 29, 1991.]

APPENDIX A

SHUTTLE ERA FIRSTS

February 1964 - NASA engineers conduct several studies of an Integral Launch and Re-entry Vehicle.

February 1970 - NASA opens Space Shuttle Office.

January 1972 - President Nixon announces intention to proceed with Shuttle.

June 1974 - Rockwell International begins building Shuttle Enterprise for use in approach and landing tests.

September 1976 - Enterprise rolls out.

August 1977 - First of five approach, landing tests. Enterprise is dropped from a Boeing 747 at 22,000 feet.

April 1981 - Shuttle Era begins with launch of Columbia and STS 1, first of four orbital test flights.

November 1982 - Columbia flies first mission in which two commercial satellites are deployed.

April 1983 - First flight of Shuttle Challenger; first made-in-space product - microscopic latex spheres, for use in scientific calibration.

June 1983 - **Sally Ride** becomes first U. S. woman in space. Challenger's five-member crew was largest ever.

August 1983 - **Guion Bluford** Jr. becomes first U. S. Black in space; first night launch and landing.

February 1984 - **Bruce McCandless** makes first untethered spacewalk using Manned Maneuvering Unit.

April 1984 - Challenger crew makes first repair and redeployment of a satellite, the Solar Maximum spacecraft.

August 1984 - First deployment and testing of huge solar array panel by **Judith Resnik**, first commercial payload specialist, and **Charles Walker**.

October 1984 - **Kathryn Sullivan** becomes first U. S. woman to walk in space; first seven-member crew.

November 1984 - First retrieval of satellite in orbit.

June 1985 - First deployment of four satellites.

August 1985 - **James "Ox" van Hoften** logs record 7-hour spacewalk to repair Leasat (Syncom IV-3).

November 1985 - First assembly of structure in space, a 45-foot beam tower, to test building techniques.

January 1986 - Challenger destroyed 73 seconds after liftoff when hot gases burned through O-ring in solid rocket booster; seven astronauts killed; fleet grounded.

June 1986 - Presidential commission recommends nine safety measures that NASA implements.

September 1988 - Discovery returns USA to space.

May 1989 - First planetary probe - Magellan - deployed from Shuttle, launches toward Venus.

April 1990 - Hubble Space Telescope deployed.

["Space Shuttle Era A Legacy of 'Firsts'," USA TODAY, p. 8A, April 12, 1991.]

APPENDIX B

SHUTTLE LANDINGS AT KSC

Mission	Orbiter	Landing Date
STS 41-B	Challenger	February 11, 1984
STS 41-G	Challenger	October 13, 1984
STS 51-A	Discovery	November 16, 1991
STS 51-C	Discovery	January 27, 1985
STS 51-D	Discovery	April 19, 1985
STS 38	Atlantis	November 20, 1990
STS 39	Discovery	May 6, 1991
STS 43	Atlantis	August 11, 1991

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16. Abstract
The document is intended to serve as a record of KSC events and as a reference source for historians and other researchers. Arrangement is by day and month and individual articles are attributed to published sources. This edition has two appendices: (A) Shuttle Era Firsts (p. 261) and (B) Shuttle Landings at KSC (p. 263) and two indexes: General Index (p. 273) and Company Index (p. 274).

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